News of the Industry Begins Page 808

AUTOMOTIVE INDUSTRIES

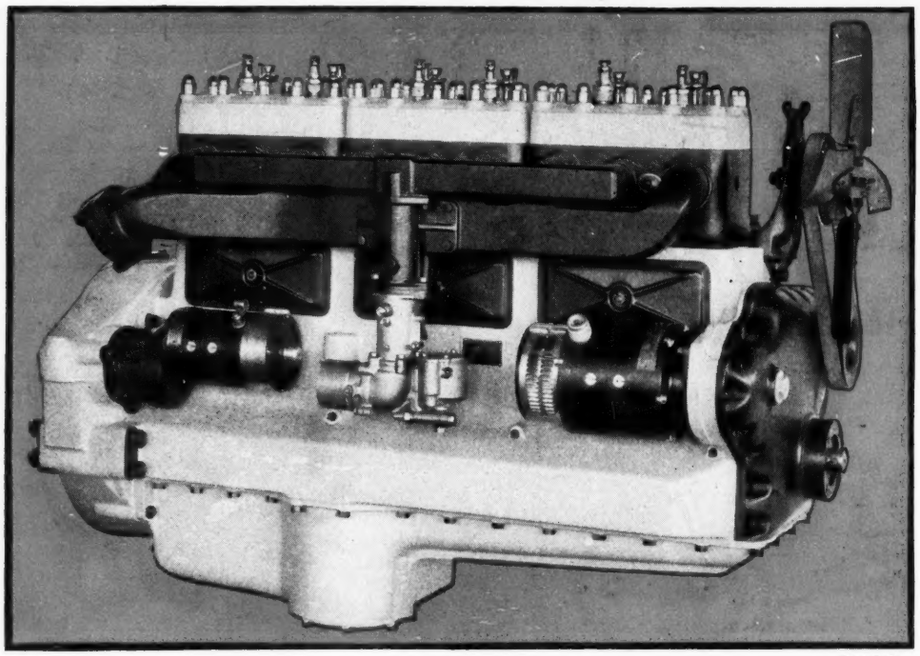
Volume 57
Number 22

PUBLISHED WEEKLY AT CHESTNUT AND 56TH STREETS
PHILADELPHIA, NOVEMBER 26, 1927

35c a copy
$3.00 a year

Entered as second-class matter Oct. 1, 1925, at the post office at Philadelphia, Pa., under the Act of March 3, 1879

Waukesha Heavy Duty Six designed for Bus and Truck Service



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Short Skirts vs. Long

Long skirts are grotesque—out of style of course and cumbersome too—but not more so than some of the bus engines used today. In the incredibly short time of three years, these 120 H. P. heavy duty Waukesha "Ricardo Head" bus engines have revolutionized bus and truck operators' ideas about design and performance. At the American Electric Railway Ass'n Convention in October two-thirds of the bus builders who purchase engines exhibited Waukesha equipped chasses. This is certain proof of what they thought of them after three years' trial.

Unusually long life and almost touring car mileage are the outstanding features of these engines. Longevity is due to the rigid combination of "girder" crankcase and a huge 3½-inch diameter crankshaft, also to an abundant supply of filtered oil which is pressure-fed to all bearings. Economy is due to the use of the genuine "Ricardo" head. Write for Bulletin 592 describing them.

A-785-LC

AUTOMOTIVE EQUIPMENT DIVISION

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Exclusive Builders of Heavy Duty Automotive Type Engines for Over Twenty Years

AUTOMOTIVE INDUSTRIES
VOLUME 57 *Philadelphia, Saturday, November 26, 1927* NUMBER 22

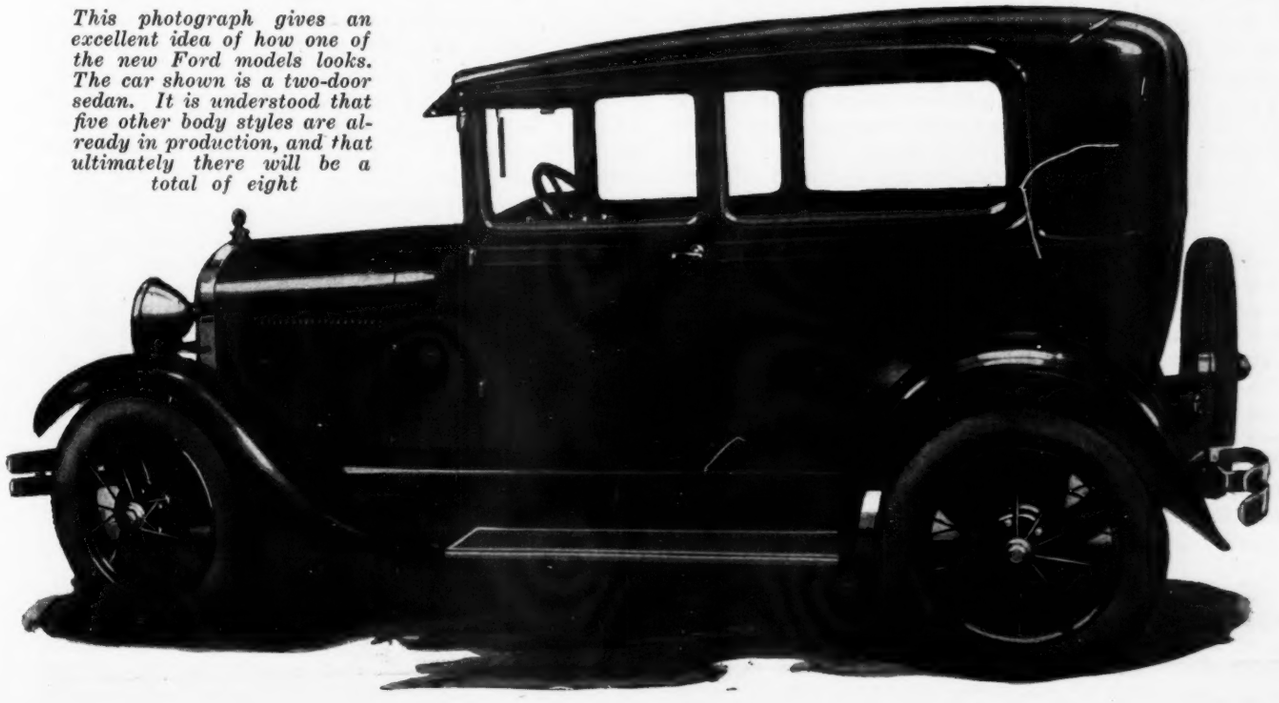
Mechanical Details of *New* FORD

Inspection of models of type now coming off line at Fordson indicates higher-speed engine of greater power and miniature Lincoln clutch and transmission.

By A. F. Denham and Lewis C. Dibble

THE new Ford "Model A" is reported ready for early announcement, limited production on both passenger cars and trucks being now under way. A number of the features of the new car have been described in these columns previously, but nothing like a correct picture of its entire make-up has been disclosed in any publication heretofore.

Close inspection of models such as those now coming from the assembly line at Fordson indicate that the car has a higher-speed engine of greater horsepower, with both oil and water pumps, a clutch and a transmission which are almost exact duplicates in miniature of the corresponding parts of the Lincoln, a torque-tube drive, a semi-floating rear axle, wire wheels, four-wheel mechanical internal brakes, transverse springs, front and rear, similar to those used on the Model T, a worm and sector steering gear, 29 by 4.50 in. balloon tires, Houdaille-type shock absorbers, bumpers, bumperettes,



This photograph gives an excellent idea of how one of the new Ford models looks. The car shown is a two-door sedan. It is understood that five other body styles are already in production, and that ultimately there will be a total of eight

¶ Public Announcement of

INDICATIONS multiply that the date of the public announcement of the long-awaited new Ford car cannot be far off. With production under way on a limited scale at the Ford plants, sample models are now finding their way to the branches and assembly plants throughout the United States. Whereas hitherto the dealers have only been able to see the car at the main plant, showings are now being made in other sections of the country. It appears, however, that the company will not be in position to deliver cars in quantities to purchasers until well after the first of the year.

A report from Kansas City placed the day for announcement to the public as Nov. 28. Dealers in Kansas, Missouri and Oklahoma were guests of the local assembling plant and indications were that the new car was shown to them. Showings are also being made at Chester, Pa., for Pennsylvania dealers, and at other points. It is reported that newspapers have received sealed advertising schedules.

At the present time one assembly line for passenger cars is in operation at the Fordson plant. It is understood that this will be augmented by the addition of three more assembly lines for passenger cars. There is also one line at the plant now being used for the assembly of the heavy trucks.

For several months the Ford factories at Fordson and Highland Park have been engaged in producing various units which will go into the new cars. These are being shipped to the various Ford assembly plants throughout the United States and also to foreign points where the company assembles its export cars. When the full assembly operations get under way at Fordson plus all the other plants the output of the Ford company will assume gigantic proportions and then the company will be able to supply the big demand which is anticipated.

The assembly line which is now in operation at Fordson is in the shape of an inverted "L." Frames and axles, including the torque tubes and wheels, are assembled on the upper leg. On the main line the entire powerplant including transmission and clutch are delivered in a fully assembled condition, there being a separate assembly line in another building for the powerplant. Next the steering gear is mounted and then the bodies are applied. The cars are then taken to another building where they are

an automatic windshield wiper and a dash gasoline gage. The engine dimensions have previously been reported as 3⅞ by 4½ in.

Eventually, it is understood there will be eight body styles. Six of these appear to be already in production, though in very limited quantities. These models include a two-passenger roadster, a two-passenger coupe, a two-passenger cabriolet-roadster fitted with a rumble seat, a two-door sedan, and a brougham.

The truck line, in addition to the ½-ton type using the passenger car chassis, includes the long anticipated truck with a larger load-carrying capacity than previously offered by Ford. The latter model uses the same powerplant as the passenger car, but has a worm-driven rear axle of the same type as formerly used and new rear springs of the floating cantilever type. The center of these springs has a trunnion mounting on the frame, the front end is shackled to the frame, and the eye at the rear end is fitted to a bracket having a bearing on the axle housing. Naurally, frames are longer and heavier on this model and are fitted with an extra pressed steel cross-member. The rear brake drums are also larger than those on the passenger car, although the front wheel brakes are identical. Tires on this truck are 30 by 5 in. high pressure cords.

The engine of the Model A is of brand-new design, and none of its major parts apparently are interchangeable with those of the Model T. For instance, the crankshaft, while still of the three-bearing type, is counterbalanced by machining the first, third, fourth and sixth crankcheeks in cylindrical form. Connecting rods are longer and lighter.

A turbulence type of cylinder head is now used and a higher compression ratio provided for. Spark plugs are mounted in the center of the combustion space, and are no longer of the ½-in. type but are ⅞-in. in diameter with 18 threads per inch, as in other makes of cars. Camshafts are of the three-bearing type, but are new in design, and have the drive gear for the vertical accessories shaft machined at the center. Of course, the engine is still of the L-head type. Camshaft drive is by a non-metallic gear, with no idler.

Lubrication System

Lubrication is by force feed to the main bearings, and by splash to all other parts. The oil pump is located at the lowest point of the pressed steel oil pan, a cover below it permitting of its removal without removing the oil pan. Oil is also delivered by pressure to the valve chamber on the right side of the engine, from where it is drained back into the sump through a large external pipe.

Cooling is by a centrifugal water pump mounted on the cylinder head and combined with the fan. The cylinder head is provided with a riser to prevent the pocketing of steam in the rear end of the block. Water enters the block centrally at the left side. A two-bladed fan is used, driven by a V-belt, the belt also driving the generator which is mounted forward on the left side of the engine. Adjustment is by swinging the genera-

New Car Not Far Off

tuned up and given a final inspection.

Besides mechanical improvements, the Fords are apparently taking into careful consideration several other important factors which have been determining factors in motor car sales during recent years and all these factors might be grouped into one heading which is known as eye appeal.

Whereas in the Model T little attention was paid to general appearance of the car, the new Fords are radically different in that they will be offered in a wide variety of beautiful color effects besides many artistic little appointments which were acutely lacking in the predecessor.

The heavier crown fenders which hug the wire wheels are a distinct improvement over the former Ford type. More attention has also been given to the radiator shell, which, besides being more graceful, carries a neat oval name plate with the name Ford worked out in the familiar script with a background of blue enamel. Headlamp contour also resembles in many respects the lamps used on the Lincoln, but of course, are smaller, in keeping with the car.

Coachwork on the new Fords presents perhaps the most artistic departure from the old Model T's. Naturally the new chassis hugs the road closer than its predecessor, but a still lower appearance has been gained in the bodies. Roof rails drop down a considerable distance on the sides of the bodies. This, combined with the use of a higher belt line, which results in windows of much less depth than the old ones, gives the car a low and longer appearance.

Interiors of the bodies present still additional features which no doubt will be big selling factors. Instruments have been very attractively grouped on the dash, while hardware of really pleasing design has been used. These features, combined with striped upholstery, all go to make the new Fords much more attractive in appearance inside.

The new cars, it is understood, will be provided in a fairly wide variety of body models. Besides the conventional two-door and four-door sedan the cars will also be available in attractive brougham bodies. A very neat cabriolet will also augment the regular coupe. It has a top covering of a rubberized material which resembles in appearance khaki and is also provided with a rumble seat. Then there are the touring car and roadster in the open model line.

tor, an unusually large adjusting range being provided. While the fin-and-tube type radiator core has been retained, the tubes are now staggered to increase the cooling efficiency. A shroud similar to that used on the Lincoln is fitted to the back of the radiator.

Fuel feed is by gravity. The tank itself forms the upper part of the cowl. From here the fuel passes through a sediment trap to the carburetor. The new inlet manifold is of the down-draft, two-port type, and has the vertical riser bolted to the exhaust manifold, forming a hot spot. A float-operated, dash-mounted gasoline gage is standard equipment.

A three-unit electrical system is used on the new cars and trucks. As has been mentioned, the generator, which is of Ford design, is driven by the fan belt. The starter is conventional and is mounted on the front of the flywheel housing on the side opposite to the generator. The ignition system is of American Bosch manufacture but has the Ford name stamped on its units. The new distributor is mounted on top of the cylinder head, where it is driven by a vertical shaft, gear-driven from the center of the camshaft, the lower end of the vertical shaft driving the oil pump. The cover for the new distributor is of molded composition and is unique in that it has extensions running about 4 in. fore and aft over the cylinder block. Incased in these extensions are the leads for the various spark plugs. These leads are brought to the top of the extensions, where short brass strips are fastened down with round finger nuts. The other ends of these strips attach directly to the plugs. The coil for the new ignition system is mounted on the front of the dash.

Four-point suspension is used for the engine, the rear support brackets on the flywheel housing bolting directly to the frame side members, thus forming an additional cross-member, while at the front the engine is supported on a rearward extension, in the form of an inverted channel, of the frame front cross-member.

As has been mentioned, the clutch and transmission are similar in design to the corresponding units used in the Lincoln, the transmission being of the three-speed, standard-shift type, and the clutch a multiple disk, dry design.

Torque Tube Drive Used

As formerly, torque tube drive is used. This torque tube is tapered from about the middle of its length forward to the universal joint housing, and is bolted to the axle housing at the rear. Radius rods are of hollow elliptic section and connect by a ball joint to the torque tube immediately back of the transmission. A built-up rear axle housing is used, with the two sides of the housing bolted to the central cylindrical part inclosing the differential and drive gears. Two large, hollow-head plugs are used for filling with oil and draining respectively. Axle shafts are keyed to the wheel hubs. There is no support for the axle shafts inside of the axle housing, but the load is taken by the axle housing itself from the wheel hubs directly, the latter being mounted on pilot roller bearings on case-hardened

steel sleeves pressed onto the ends of the housing.

Two - shoe construction is used for the internal four-wheel brakes. These "Grey Rock" shoes carry the regulation riveted woven brake-lining. The brakes are rod - operated. The brakeshoes are spread apart by a wedge between rollers on the shoes, the wedge push rod passing through the knuckle pin. At the top the shoes are connected by short levers to a bracket which has an adjustment outside of the brake, this adjustment spreading the tops of the shoes apart to take up wear. The brake operating pressure is equalized between front and rear. From the pedal a short rod runs back to a cross shaft under the center cross member, the pull being transmitted by means of bell cranks to two horizontal shafts below them. The outer ends of the latter shafts are not rigidly supported but can move back and forth. Attached to these outer ends are double armed levers, the upper arm actuating the rear wheel brake by means of a tension rod, and the lower the front wheel brake, the non-rigid mounting of the shafts equalizing the force of brake application.

With the adoption of a worm-and-sector steering gear the famous planetary type steering mechanism has been discarded. The new gear is conventional in appearance, the worm sector shaft passing through the frame side member on the left, from which point the usual drag link extends to the left knuckle. On the other hand, the springs are still of the Model T type in the passenger cars and at the front end of the trucks. The front springs, however, have a considerably smaller camber, which, together with a drop in the front axle, lowers the front end of the bodies considerably. Ten leaves are used in the front spring. The rear spring is of the characteristic Model T design.

Specifically designed for use with four-wheel brakes, the front axle has an I-beam center section. The entire axle is slightly curved, its lowest point being at the center. At the ends, outside of the front spring shackle bracket mounting, the web of the section is thickened. These brackets, incidentally, serve also to mount the front wheel brake linkage, on an arm curving out over the top of the steering spindle, and for the axle connection for the Houdaille-type shock absorbers, the latter being mounted on the outside of the frame side members.

As has been mentioned, three cross members are used in the frame. These are all of the gusseted type, the front member having the form of a double channel, while the others are of the regular channel type. In contrast to statements recently made in other publications, the frame members are riveted together and not welded. The cross-members, of course, are supplemented by the rear engine supports, which virtually form an additional cross-member. There is also a pressed steel member tying together the rear bumpers. An outward bulge of the rear part of the frame is also noticeable.

Radius rods for the front axle have also been redesigned. Like those for the rear axle, they are of the tubular type with an elliptic cross-section, and they connect at the rear end to the bottom of the transmission case through a ball joint. At the front end, they connect to the axle by means of yoke-and-pin joints, the pins passing vertically through eyes in the yoke and the front axle.

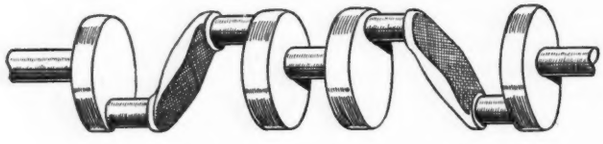
Wire wheels of the same type as used on the last Model T series are standard equipment, a spare wheel being included. As announced in these columns recently, in the case of the passenger cars these take 29 by 4.50 in. balloon tires. Emergency brake operation is by means of a hand lever located at the left side of the driver, the ratchet and pawl release rod being inclosed inside the tubular emergency lever proper. This lever

The Most Complete and Detailed Story of the New Ford Yet Printed

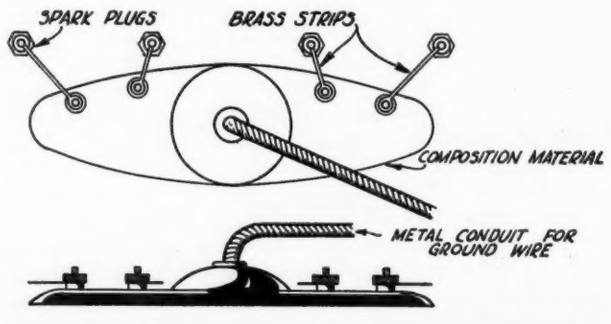
FOR months the industry and the press have been full of rumors about what will be the detailed mechanical construction of the new Ford. The most likely looking of these rumors have been printed in these columns as well as elsewhere.

Now, for the first time, *Automotive Industries* and other Chilton Class Journal publications are able to print in greater detail, and with what we believe to be greater accuracy than has been possible previously in our own or other publications, the story that the whole industry has been waiting for—that of reasonably complete mechanical details of the Ford cars now coming off the production line at River Rouge.

While the features outlined in the accompanying article may be found to have been slightly altered when the final announcement of the new Ford is made, the source from which this exclusive Chilton Class Journal story was procured is, it is believed, such as to preclude any material divergences, unless the unexpected happens and there is a wholesale scrapping of present production arrangements.



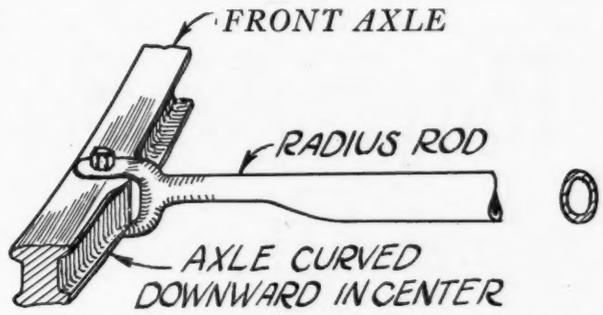
Sketch indicating general features of crankshaft design



Sketch indicating general arrangement of ignition wiring

connects to the service brake linkage by means of a rod, there being no separate emergency brake.

Bodies are of composite construction. The body and pillars, and the roof side rails are of wood, sheet-steel-clad, and are covered with sheet-steel panels. On the closed models, complete body side panels are built up and flash-welded onto the rear body panel. Tops are fabric-covered. Cowls are made in three pieces, the top part being formed by the gasoline tank, to which the side panels are flash-welded.



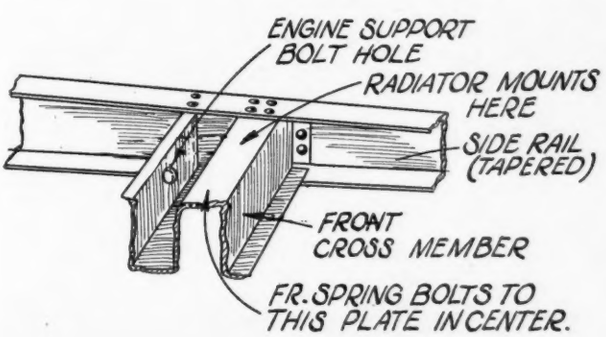
Sketch indicating general characteristics of front axle radius rod design

As mentioned in a previous article which appeared in these columns, the radiator shells are similar in contour to those used on the Lincoln, and have the Ford name on a blue background in an oval on the shell. Body lines, although not unconventional, are remarkably improved in appearance, the same general idea of body design having been carried on in the other body styles. Fenders are full-crowned, belt lines are higher, and the wheelbase is longer.

New Instrument Panel

A new instrument panel is adopted. This is roughly of diamond-shape, with the dash gasoline gage, reading in quarters of tank capacity, at the top, the speedometer at the bottom, the ammeter at the right the ignition lock at the left and the instrument board lamp in the center. The ignition lock is of the Electrolock type, grounding the distributor, the connecting cable being enclosed in a metal conduit. Spark and throttle control levers are still mounted on the steering column below the wheel, but the former quadrants have been eliminated, and a foot accelerator is provided. Above the wheel on the steering column is mounted the light control lever. Double-filament, double-contact bulbs are used in the bullet-type headlamps.

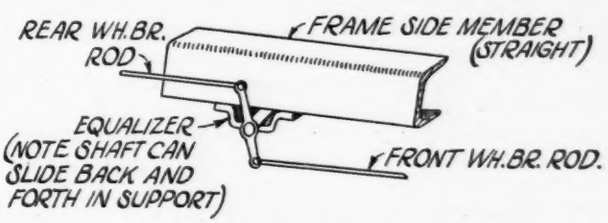
A combination tail and stop light is standard equipment, as are also Houdaille shock absorbers, front bumpers and rear bumperettes. The latter attach to both the frame and the body and are curved to carry out body lines. They, as well as the front bumpers, are assembled on the cars before the body is put on, but are easily removable. Additional items of equipment are an automatic windshield wiper, a swingingtype one-piece windshield with ventilating ports in the top of the cowl exposed when opening the windshield, a speedometer, which is driven from the front end of the propeller shaft, and a Sparton horn which is mounted between the radiator shell and the left fender below the headlamp. The crank handle is removable, whereas in the Model T it could not be removed. The running-boards are of steel construction, rubber-covered, with aluminum bindings and concealed screws.



Sketch showing multiple duties of frame front cross-member

Interior finish of the cars is also decidedly improved. On the open models and the cabriolet unpleated brown imitation leather is used for the upholstery, the seat cushions having a single pleat running lengthwise of the cushion, about two-thirds of the way forward. In the closed cars cloth upholstery is used, with doors and side walls trimmed in the same materials, the doors being fitted with pockets also made of pleated upholstery material. Door controls are of the remote type, operating by lifting the lever, rather than by turning it. Windows are crank-operated, and door snap locks are provided inside the closed cars. On the cabriolet a regulation roll-up type of rear curtain is provided.

From a servicing angle, the addition of oil has been simplified by the provision of a long filler pipe at the left side of the engine. The gasoline tank filler projects over the top of the cowl. Lubrication of all chassis parts, as well as the fan shaft and steering gear bearings, is by means of high pressure grease gun fittings.



Sketch indicating method of equalizing front and rear brakes

At the Fordson plant output is said to be averaging from 30 to 50 cars a day and it is understood that this will be greatly augmented this week when several shifts of men are expected to be put on the production line, which will be kept operating night and day.

As soon as enough cars are made to sample the 10,000 Ford dealers throughout the country, the car, it is understood, will be formally announced. This probably will occur in December. However, the company is not expected to be in a position to deliver cars in quantities to purchasers until after the first of the year.

Speculation is rife in the industry on how the new Fords will be received. One thing is certain and that is that the great drawing power of the Ford name, coupled with all that has been said in past months about the new cars, will attract the largest throngs that have ever turned out to examine a new automobile.

The Ford company on several occasions has let it be known that dealers have thousands of orders on hand. These, coupled with the orders which are expected to follow the first showing of the new car, probably will keep the Ford plants the busiest they have been in years, once they have swung into full production.

Greater Power *and* Smoothness Built *Into* Chrysler "*80*"

Engine bore increased and 6.1 compression ratio made standard. New methods of counterweighting are adopted. Bodies longer and lower.

By A. F. Denham

THE extent to which the research laboratory is influencing modern motor car design is well illustrated in the improved Imperial "80" now being shipped to Chrysler dealers. As would be expected, the mechanical innovations affect rather minor parts, but all of the new ideas combined have the effect of producing a marked improvement in performance.

Power is increased by several means, including a slight increase in bore, the adoption of a 6.1 compression ratio as standard, and the development of a new muffler design which materially reduces back pressure. Better acceleration is obtained also not only by these changes but by a new principle of fuel supply in the carburetor under accelerating conditions. Greater smoothness is obtained by new methods of counterweighting and torsional vibration damping.

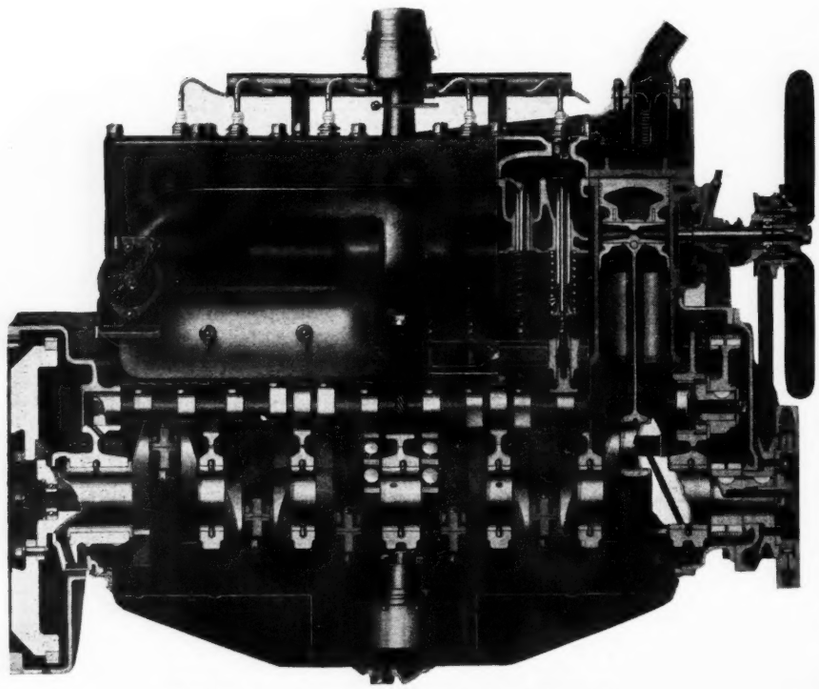
Other changes that make for greater smoothness include an innovation in clutch disk design and the adoption of a welded sheet-steel propeller shaft. Transmissions now have an aluminum housing and a ball bearing type rear axle has been adopted.

Coincident with these changes the wheelbase has been increased, the bodies have been lowered by changes in spring design, and an extensive line of custom models designed by LeBaron, Locke, and Deitrich is being offered.

The standard line now ranges in price from $2,795 to $3,495, the various body models listing as follows:

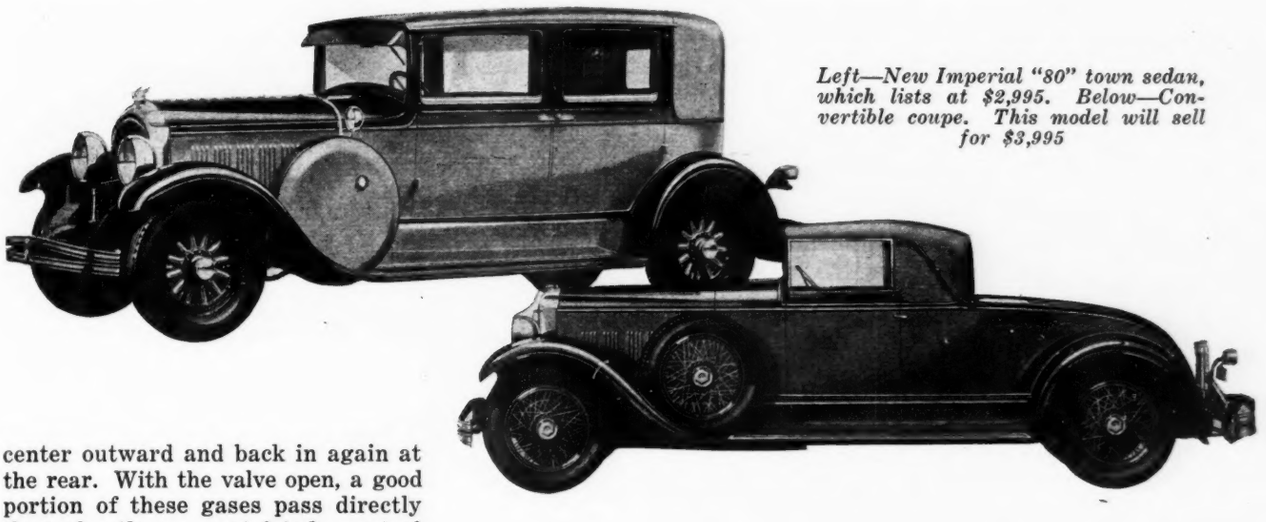
Roadster	$2,795
Close Coupled Sedan	2,995
5-pass. Sedan	2,945
7-pass. Sedan	3,075
Sedan Limousine	3,495

Engine changes probably lead in interest. The greatly increased power of the engine (112 hp. at 3300 r.p.m.) is due to a number of changes. An eighth of an inch has been added to the bore, which is now 3⅝ in., giving the engine a piston displacement of 309.3 cu. in. "Red Head," 6.1 compression ratio heads are standard on all models. These heads, which require the use of anti-knock fuels, were offered at additional cost on the former 80, but the great demand for them induced the Chrysler Corp. to adopt them as standard on this chassis.



Sectional view of new Chrysler 80 engine

In order to further increase engine power, a new type of muffler has been adopted. This design is an outgrowth of experimentation on the open models of the former 80 line. These were equipped with a valve-controlled bypass pipe around the muffler. In the new line this design has been improved by the provision of a straight unobstructed passage through the center of the muffler, which can be shut off at will by means of a butterfly valve at the rear end. With the valve closed, all gases pass through the muffler, which is of the Oldham type, the gases passing from the



Left—New Imperial "80" town sedan, which lists at $2,995. Below—Convertible coupe. This model will sell for $3,995

center outward and back in again at the rear. With the valve open, a good portion of these gases pass directly through the unrestricted central pipe. A definite reduction in the back pressure of the exhaust system is said to be effected, yet since the muffler forms a reservoir, the open central passage does not produce the characteristic cut-out noise, prohibited by law in many localities.

To obtain smoother acceleration, a new principle of fuel feed has been incorporated in the Stromberg 1¾ in. carburetor. In this carburetor, which is of the plain tube type, there is an ingenuous fuel pump, operated positively in connection with the throttle control. When the throttle is opened, a cylinder is depressed in the accelerating well chamber. This action forces a piston in the cylinder downward, uncovering a port leading to the main jet. Since the piston referred to is mounted on a helical spring, pressure has been created in the chamber by means of which gasoline is forced out through the main jet. The spring on which the piston rests having been compressed originally, the piston is gradually returned to its original position, as the pressure in the chamber decreases, forcing additional fuel out through the main jet. By this follow-up action of the piston, lagging periods during acceleration are eliminated. The riser of the intake manifold has been increased in diameter, to correspond to the increased size of the carburetor.

Changes in Crankshafts

Changes have been made in the design of the crankshaft whereby it has been possible to greatly reduce the counter-weights, thus raising the various critical speeds and bringing the upper one well outside the driving range. In a six-cylinder engine the throws at opposite ends of a main bearing are at 120 deg. to each other and therefore partly balance each other. The unbalanced resultant bisects the angle between the throws, and the two counter-weights at opposite ends of a main bearing, instead of being placed opposite the respective crank arms, are placed opposite to this resultant force. The Chrysler company arrived at the conclusion that it is preferable not to completely balance the crank throws, and in the final design only 75 per cent of the throws is counter-balanced, which makes for another saving in rotating weight.

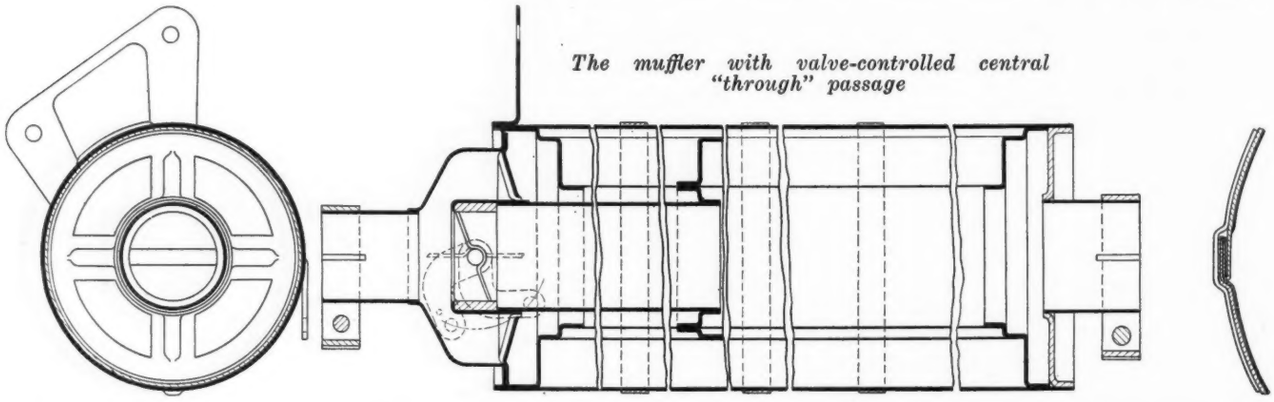
Seven-bearing crankshaft which is now used in the Imperial "80." It is both counter-balanced and counter-weighted

The new torsion neutralizer at the front end of the crankshaft also involves an interesting development. The usual type of torsional vibration damper, having a constant pressure on the friction element, varies in effectiveness with the speed of the engine. It was, therefore, decided to develop a method by which the pressure on the friction element cannot be varied automatically to make it effective at all speeds. In the design finally adopted the usual compression springs take care of torsional vibration in the lower engine speed range. At higher engine speeds the damping effect is suitably altered by the use of a lead-impregnated rubber ring, trapezoidal in cross-section, mounted in a trapezoidal groove between the halves of the torsion neutralizer. A small annular space is left outside the ring. As the engine speed increases centrifugal force causes the rubber ring to expand, filling the small space and forcing the plates apart, thereby increasing the pressure on the friction element. Since the lower periods of vibration are taken care of by the usual compression springs, the rubber ring was designed to care for the vibration periods at higher engine speeds. The object of the lead impregnation is to obtain a higher specific weight for the ring and increase its flow under centrifugal force.

Five-ring aluminum alloy pistons with nickel-alloy struts are another feature of the series 80 engine. First introduced recently on the Chrysler 72, these pistons are characterized by the use of four compression rings in pairs, the rings of each pair being tongued in opposite directions, the tongues meeting in the center over an undercut land of the piston. A feature of these tongue-type rings is said to be that they provide a better oil seal under the rings, due to capillary action, and thereby increase the heat flow, aside from the increased heat dissemination occasioned by the wider outside faces of the rings. An oil control ring on these pistons is used merely to regulate the amount of oil needed for the oil seal under the compression rings.

The rear engine supports have been redesigned in order to obtain with

the rubber-insulated type of support the same effect of rigidity as with the rigid mounting, and thus retain the value of the flywheel housing as a frame cross-member. To this end the size of the engine brackets has been increased and the rubber insulating plates between engine brackets and frame side members and outside of the frame channel, have been increased in depth to practically that of the frame channel, and the bolt holes are located in the four corners.



The muffler with valve-controlled central "through" passage

Although of conventional design, the transmission also is new. Chrome steel is used for the gears, which have face widths of 13/16 in. for the countershaft drive, first speed and reverse, and 15/16 in. for the second speed. The housing is now an aluminum casting, this change having been made to reduce transmission noises. Ball bearings are used on the splined shaft, roller bearings for the main shaft pilot and on the countershaft. Gear ratios in the new unit are 3.02 for the low speed, 1.74 for second, and 3.82 for the reverse. Standard rear axle gear ratios are 3.77 to 1 in the roadster, and 4.08 to 1 in the other models.

Several changes have been made in the clutch, which is practically of new design. In the first place, the driven disk is larger, being 11 in. in diameter, to take care of the increased engine power. The adoption of riveted friction lining instead of the former woven-in type is important from a service angle. The third change is in the adoption of a steel-spring flexible member equivalent to the rubber clutch inserts which have been adopted recently on a number of cars.

Damps Out Vibration

Intended merely to absorb sudden shocks, experiments showed that the rubber clutch inserts performed another function, that of damping out torsional vibrations in the drive mechanism. This was due to the fact that the disks were manufactured by impregnating a fabric disk with rubber. Under torsional vibrations internal friction was set up in the fabric part which aided materially in damping out vibrations.

To reproduce this action mechanically, thus eliminating the possible objection that the rubber in the disks may be affected by oil in the flywheel housing, a fabric friction element was inserted between the driven disk and the clutch shaft plate in a normal single plate clutch. Under the heads of the bolts which fasten the driven disk to this plate were placed small compression springs serving to produce pressure on the friction element, adjustable by merely tightening the bolts down further. The bolts themselves pass through slotted holes to permit of relative motion of disk and clutch center. In order to return the bolts to the centers of these slots, and also to reproduce the shock absorbing action of the rubber disks, short helical springs are used, circumferentially arranged, with one end resting against a pin on the clutch center, and the other end against a pin on the driven plate. These springs are under initial compression. In action, under torsional vibration, or under shock, the clutch center will move relatively to the driven disk, compressing one-half of the circumferential springs, while the friction between the driven disk, friction ring and clutch center will have a damping effect and prevent vibrating motion.

Welded sheet steel is used for the tubular propeller shaft, to obtain a better balance. The shaft has been strengthened in proportion to the increased engine power and is tapered down at the ends. Forged ends are electrically welded to this shaft.

A new semi-floating, bevel-gear-drive rear axle has been adopted, with Timken roller bearings at the differential side gears, and all other bearings of the ball type. Gear ratios have been lowered on the roadster from 4.18 to 3.77, and on the other models from 4.64 to 4.08, indicating that higher road speeds are now obtainable. Shafts are of chrome nickel steel, with the wheel hubs keyed on. The drive gear is 12 in. in diameter and has a 1⅜ in. face.

The Lockheed four-wheel hydraulic brakes are now of the internal type. Drums have been increased in diameter to 15 in., the lining being 1¾ in. wide and 5/16 in. thick. An automatic brake-line-refilling oil tank surrounds the master cylinder below the brake pedal. The emergency brake on the transmission is continued.

With the increase in wheelbase the rear springs have been lengthened and are now 58 3/16 in. long and 2¼ in. wide. Spring mounting designs and spring cambers have been changed so as to lower the frame by approximately 2 in. Steering gears and front axle continue practically unchanged, the latter having a 2½ in. tubular center section. Yoke bushings have an inside diameter of 1 in., are 1/16 in. thick and 1⅜ in. long. Steering knuckles are of chrome-nickel steel, with chrome vanadium steel steering arms. The chrome-nickel steel knuckle pins are chromium-plated to make them more resistant to wear.

As formerly, the frames are of pressed steel, 7 by 2½ by 9/64 in. Five channel-section and two tubular cross members are used, the whole frame having an overall length of 184¼ in. Mounted at the rear is the 20-gal. fuel tank in which is incorporated a three-gallon reserve tank which can be turned off and on at the tank.

Artillery wheels are standard on all models except the roadster, which has wire wheels as standard equipment. All models are fitted with 30 by 6.75 in. bal-

loon tires.

Perhaps most striking in the new bodies is the increased length and decreased height. While actual dimensional changes have been effected, the chassis being 2 in. lower and the wheelbase 3 in. longer, the bodies appear even longer and lower due to the use of cheat lines and to the molding treatment.

Colors Widely Used

Colors are more widely used than is usually the case. Radiator cores, fenders, tops, sun visors, and even tire and truck covers, are in colors harmonizing with those of the body proper. Radiator shells and the ball-shaped head lamps are chromium-plated. Radiators are also higher than formerly and the characteristic flute in the hood has been made narrower, blending into the hood instead of being carried on into the cowl, as formerly, the new lines being decidedly more pleasing. Hood louvres are vertical and grouped in fours for individuality.

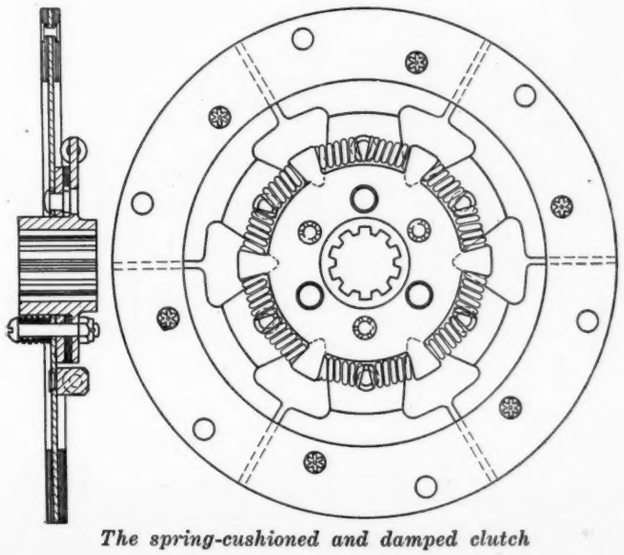
Bumpers of special design, which are standard on the cars, are curved to carry out the body lines and are colored to match the body tones. Name plates and monograms have been removed from both hubcaps and radiator shells, leaving only the wings on the filler cap to disclose the make of the car.

As regards features of body design, the doors are wider and the corner pillars narrower. Fenders are full-crowned, with more sweeping lines, and are assembled on the cars with glazed fabric packing strips. Running boards are of steel, rubber covered, with concealed screws in the aluminum binding. Cowl lights are mounted on a nickel-plated ring which runs around the cowl back of the joint with the hood.

Inside the cars are found front compartment ventilators on both sides of the cowl near the floorboards, and adjustable foot rests for the rear compartments. In the closed models front seats are carried straight across instead of being curved. This is done to permit the use of a sliding glass partition between front and rear compartments, this partition being standard on the sedan-limousine and optional on other closed models. On the seven-passenger sedan wide auxiliary seats capable of seating three passengers are provided, these seats meeting in the middle.

Grouped under a narrower, shell-shaped instrument panel are an electric dash gasoline gage, engine thermometer and clock, in addition to the usual instruments. In the sedan-limousines a metal handgrip is provided in place of the customary toggle. Headlamp, spark and throttle controls are mounted above the steering wheel, while below, on the steering column, is mounted an Electrolock, the windshield wiper control, and an electric fumer (for heating gasoline when starting) control.

Standard equipment includes bumpers, shock absorbers, combination stop, tail and backing-up light, windshield wiper, rear view mirror, windshield wings on the open cars, fuel filter, oil filter, thermostat in cooling system, dash gasoline gage, clock, heater on the closed cars and a telephone on the sedan-limousine. A lock is also provided for the spare tire. In addition to the double filament bulbs in the headlights, auxiliary parking bulbs are provided. The seven-passenger sedan and sedan-limousine are fitted with dome lamps, operated by the doors, while the five-passenger sedans have corner lamps.



The spring-cushioned and damped clutch

Paper on Chromium Plating

SOME pointers on chromium plating were given in a paper by M. S. Field read before the Electroplaters and Depositors' Technical Society. The chromic acid used should be as pure as possible, and the usual impurity, sulphuric acid, should not exceed 1.2 per cent. After a certain period of electrolysis the solution always has a red-brown color, which is obtained by the addition of a carbonate or an oxide and which is due to a definite compound of chromiuum chromate which forms by aging.

In 1925, a German chemist, Liebreich, patented a solution formed of chromic acid treated for a period by the passage of a feeble electric current. A later patent to the same inventor indicated that by heating chromic acid to from 340 to 390 deg. Fahr. the water is driven off and the pasty mass obtained is dissolved in water and used immediately. This takes the place of aging.

The current density and the temperature have important effects on the nature of the deposit. With Sargent's solution (chromic acid 245 parts by weight, chromium sulphate 3 parts and water 1000 parts) a current density of 0.58 amp. per sq. in. is used when cold, the potential difference being 3 volts and the distance between electrodes 1 in. This gives a normal coating susceptible of taking a good polish. It is necessary that an insoluble film of chromium chromate should form around the cathode, under which the metal is deposited. At 60 deg. Fahr. one obtains a dull hard deposit, at 100 deg. it is brilliant but delicate. Moreover, the efficiency from the energy consumption standpoint is two and one-half times as great with a current density of 1.25 amp. per sq. in. as with a density of 1/3 amp. per sq. in.

The ideal cell is of stoneware, but a steel tank gives satisfactory results. In large production installations, employing currents of 1000 to 2000 amp., owing to the low current efficiency, there is considerable development of heat, and if it is desired to obtain a fair efficiency it is necessary to cool the solution. However, the energy efficiency is always low, of the order of 30 per cent at best and more generally 20 per cent.

Metallic chromium is not well suited for the anodes, for the reason that it dissolves too readily. With a chromium metal anode the anode efficiency is high and the cathode efficiency low.

"End the War for the Motorist"

George M. Graham

Mr. Graham, a director and member of the taxation committee of the National Automobile Chamber of Commerce, represented that organization at the recent tax hearings and asked Congress to "end the war for the motorist as it has already been ended for other groups"

50% Cut in Automobile Tax *is* Indicated Now

Vigorous fight waged against excise levy by automotive organizations apparently bearing fruit. House Ways and Means Committee will recommend reduction from 3 to 1½%

WHILE it appeared extremely doubtful a few weeks ago that the war tax on automobiles would be abolished or even greatly reduced as a part of the Government's forthcoming general tax cut, a recent and sudden shift in the situation has occurred to give the matter an entirely different aspect. The cloud has taken on a lining of at least 50 per cent silver.

Automotive men lost hope of accomplishing much after Secretary of the Treasury Mellon published his statement that the total tax cut should not exceed $225,000,000, and that the automobile tax, together with certain others, should be continued in order to hold the reduction to that figure. Nevertheless, they did not give up the fight. They descended on the House Ways and Means Committee in force at the hearing in Washington on Nov. 7, and argued to such good purpose that they apparently removed any doubt the committee may have felt as to the advisability of eliminating or at least reducing the 3 per cent tax.

After deliberating for several weeks, the committee on Nov. 21 voted tentatively to over-ride the Treasury proposal to limit the total reduction to $225,000,000 and to set the maximum at $250,000,000—included in which was to be either a material reduction or complete repeal of the automobile tax.

Then on Nov. 22 it was voted to make the total cut $235,820,000, and on another vote, 18 to 5, the committee decided to recommend a 50 per cent reduction in the automobile tax, slicing the present 3 per cent tax to 1½ per cent. It is estimated that this will mean a saving of about $33,000,000 a year to car buyers.

If the tentative program thus adopted by the committee is carried out, and the tax reduced, due credit must be given to the National Automobile Chamber of Commerce and the other national automotive organizations which carried the fight into the committee hearing. These organizations included the National Automobile Dealers Association, the American Automobile Association, the Motor & Accessory Manufacturers Association, and the American Motorists Association.

The arguments of the N.A.C.C. were presented by George M. Graham, whose keynote was to "end the war for the motorist as it has already been ended for other groups."

Can't Agree With Mellon

"The leaders of the motor industry have a high respect for Mr. Mellon," said Mr. Graham, "but we cannot but differ with him with regard to the continuance of the motor excise taxes as a levy on a 'semi-luxury.'

"Motor car manufacture gives employment to nearly 4,000,000 laborers, directly or indirectly. It is the largest industry in the country, and the largest exporter of fabricated goods. It is a large consumer of raw materials of a thousand varieties, and there is today no business which does not reflect conditions in the motor industry.

"The Ways and Means Committee would not consider reducing the exemptions on the lowest brackets of the

income tax. It would not put a sales tax on shoes, and flour, and impose a Federal land tax on the farmer. Yet, what is the difference between these levies and the automobile tax, when in both cases the same people pay the tax, as is shown by the fact that 70 per cent of the new cars sold in 1926 had a wholesale value of $750 or less, and most of them went to the small towns?"

Answering Mr. Mellon's question as to whether it is fair to ask the railroads to contribute to the construction and maintenance of roads on which their rivals operate while exempting the latter from any contribution, Mr. Graham said:

"Since Federal appropriations are but 2 per cent of the total annual expenditures of the Government, it is fair to say that only 2 per cent of the general taxes paid by the railroads or less than $2,000,000 in 1925 of the railroad taxes went to highways.

"Further, every automobile manufacturer, distributor, dealer and highway transportation company pays the same general taxes as do the railroads and in addition, they pay excise taxes which are precisely the same as the discriminatory taxes on railroad transportation, the telephone and the telegraph which Congress repealed immediately at the close of the war.

"Beyond this, every motor car user pays all kinds of State and municipal special taxes. Last year his total special taxes amounted to $712,000,000, or enough to pay all current highway costs, and yet he still had to pay in addition all of the ordinary taxes to which all industry and individuals are subjected.

"Insofar as highway competition is concerned, it is only recently that John J. Esch, chairman of the Interstate Commerce Commission, said publicly that the railroads are deriving a far greater revenue from motor transport than they have lost.

"It is a further fact that the railroads are today becoming large users of trucks and buses and no one can deny that were road improvement to stop today that rail revenues would be seriously crippled."

Meeting the Secretary's comment that motor users should make some contribution in return for Federal highway appropriations, Mr. Graham pointed out that Federal road funds are justified only as the improvement of post roads constitutes a general benefit.

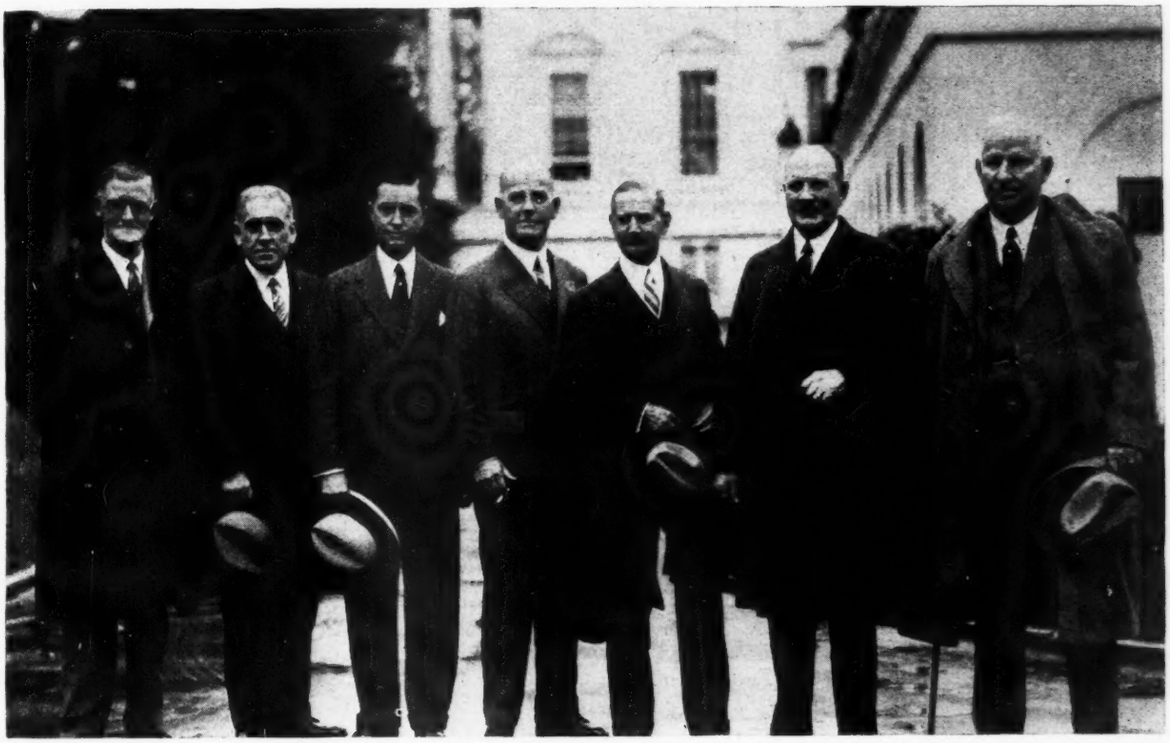
No Relationship

"Federal highway aid was granted first and motor excise taxes were imposed only for emergency revenue needs," he said. "There is no relationship between the two."

"A strong demand exists for reduction of the tax on corporation profits from the present high figure of 13½ per cent. We have no hesitancy in placing ourselves strongly with the advocates of such a reduction.

"It has been intimated that the automobile manufacturers are not wholeheartedly back of the excise tax elimination because it is stated that they would profit more by the corporation tax reduction. On the contrary, while it is true that the manufacturer would profit at first by the corporation tax reduction which finally would be passed on to consumer, the elimination of the excise tax would immediately affect the final sales price

Appeal to Coolidge for Abolition of Automobile Sales Tax



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THESE automotive leaders carried the fight for repeal of the automobile sales tax directly to the White House on Nov. 17 when they called on President Coolidge and asked him to support the move to abolish the tax. It was said afterward, however, that the President is still inclined to support Secretary Mellon in the stand that the tax should remain. Those in the party, from left to right, are: A. T. Waterfall, Detroit, vice-president of Dodge Brothers, Inc.; H. H. Rice, Detroit, assistant to the president of General Motors; R. D. Chapin, Detroit, chairman of the board of Hudson Motor Car Co. and president of the National Automobile Chamber of Commerce; Alvan Macauley, president of Packard Motor Car Co.; Alfred Reeves, general manager of the National Automobile Chamber of Commerce; Charles W. Nash, president, Nash Motors Co., and A. R. Erskine, president of Studebaker.

to the consumer and would have an appreciable effect upon sales both directly and psychologically.

"That larger business would result in increased profits resulting in greater income tax returns is undoubted. In fact this is in line with the Treasury arguments in similar situations."

Stating concurrence with Secretary Mellon in his belief that if these motor taxes are repealed now they cannot be restored in times of peace, Mr. Graham said that the industry hoped for precisely such an outcome, and closed with the statement that it was the hope of the industry that the committee would brush aside all compromise and remove these "unfair and unnecessary taxes now."

Dealers Losing Millions

Warren E. Griffith of Toledo, acting as spokesman of the tax committee of the N.A.D.A., said that automobile dealers are losing millions of dollars annually through the tax on the motor car, particularly the smaller dealers. The dealers must pay 3 per cent war tax when purchasing the cars at wholesale and must carry the burden of this tax until the cars are resold. This requires $10,000,000 in liquid capital to handle these operations. In addition, the dealers pay between two and three million dollars a year in war taxes on demonstrated cars.

Mr. Griffith pointed out that the tax makes the automobile dealer the unpaid tax collector of the Government. While the revenue bureau and the Treasury have contended that the excise tax is an easy tax to collect, the reverse is exactly true. Mr. Griffith showed that the Government collects approximately $70,000,000 of tax from about 50 car manufacturers, who in turn collect it from 50,000 dealers. These 50,000 dealers have to collect the tax from 3,500,000 car buyers, 80 per cent of whom pay the tax in instalment notes, averaging 12 to 18 payments. At least 40,000,000 bookkeeping items are set up by the dealers initially and an incalculable number of separate entries, all of which require accounting help that costs dealers millions of dollars throughout the United States. Mr. Griffith estimated that the dealers had collected over a billion dollars for the Government since the first war tax was applied, at a cost of not less than $50,000,000 to themselves.

Henry Speaks for A.A.A.

Thomas P. Henry of Detroit, president of the A.A.A., appearing in the role of spokesman for 943 motor clubs with a membership of 1,000,000 car owners. Mr. Henry ridiculed the idea that the automobile is a semi-luxury. He described as "wholly untenable" the attempt to link up the automobile tax with Federal aid for highways, pointing out that this tax had already yielded to the Government a total revenue of more than $1,068,000,000.

The attempt to justify a tax on passenger automobiles because they are said to compete with railroads, Mr. Henry declared, is "nothing short of amazing," as coming from a presumably disinterested Federal official. He stressed the fact that the burden of automobile taxes had increased at a greater rate than any other form of taxation and that the only hope of the car owners for relief at the moment lies in the repeal of the emergency war tax levied by the Federal Government.

An equally vigorous plea for the repeal of the Federal tax on buses was presented to the committee by S. A. Markel of Richmond, Va., chairman of the legislative committee of the Motor Bus Division of the A.A.A. Mr. Markel asked the committee if it is the Treasury view that an industry consisting of 70,000 individual units, operating as common carriers, carrying more than 2,250,000,000 passengers a year over 275,000 miles of routes, connecting almost every town and hamlet in America, is a "semi-luxury."

The Federal tax, he declared, adds measurably to the already heavy tax burdens of the bus operators, who are now paying at the rate of $700 per year on each bus earning an average gross revenue of $7,500, all of which is reflected in higher fares to the public and in the retarding of America's fastest growing industry.

The American Motorists Association also protested against the tax, its spokesman being J. Borton Weeks, president of the organization.

Following the hearing before the Ways and Means Committee, the fight against the tax was carried directly to the White House by a delegation of automobile manufacturers who called on President Coolidge last week. Those in the delegation included Roy D. Chapin, of the National Automobile Chamber of Commerce; Alvan Macauley, president of Packard; W. Ledyard Mitchell, vice-president of Chrysler; A. R. Erskine, president of Studebaker; H. H. Rice, of General Motors; John N. Willys, head of Willys-Overland; A. T. Waterfall, vice-president of Dodge; Charles W. Nash, president of Nash Motors, and Alfred Reeves, general manager of the N.A.C.C.

They pointed out to the President again, and as was stressed before the Ways and Means Committee, that the tax on automobiles was originally a war emergency revenue, and, the emergency having passed, the industry and the public are entitled to have it removed, instead of still being taxed in the same classification with whiskey, tobacco and pistols.

Survey of Productivity

THE National Bureau of Economic Research, Inc., is about to undertake a survey of changing productivity in the industries of this country and is seeking aid and cooperation from industrial executives who are in a position to contribute information to the survey.

The object of the study will be to ascertain as accurately as possible for the various industries and processes the typical number of hours of labor applied and to compare the output at the present time with the output at earlier periods. This information will be obtained from the records of other researches and, in those industries or for those periods of time which have not been otherwise adequately examined, the Bureau will conduct original research by a study of the records of individual plants in the industries. Factory executives who have records over all or any part of the past 30 years which they believe would enable a computation of the units of product per labor hour are requested to communicate with the Bureau.

There will be no expense to the informant and he will have available the results of the investigation in his own plant for his own use. No information received will be used in such a way that the identity of any particular concern will be revealed.

The National Bureau of Economic Research, as is probably well known, is a non-partisan, unbiased, fact-finding body which was organized in 1920 and since that time has conducted a number of surveys of great value to the economic understanding of our country's condition.

Just Among Ourselves

Individual Wallop Determines Success

WE talk plenty about the condition of business in general and there is no blinking the fact that the business of any individual manufacturer is bound up with basic economic trend. Having just spent a couple of weeks talking with a great number of parts, accessory and shop equipment manufacturers, however, we are even more strongly impressed than ever with the idea often expressed on this page, namely, that from now on the individual marketing and production efficiency of any given company is going to have just as much and probably more to do with making business good or bad for that particular company than will general conditions. Some firms, for example, enter a show or exhibition with a definite plan of sales action, a whole basketful of new ideas and an abundance of energy. Others go into the same shows with a line just about as good and just about as broad, but with a more or less passive attitude. The show booths of the first group outdraw those of the latter two or three to one. And so through the whole merchandising activity; the old individual wallop is going to be the big factor in automotive success whether it be in the car, truck, parts or accessory field—assuming, of course, a product of sound basic quality.

* * *

British May Pool Resources for Racing

THE spectacle of the entire automotive industry of a country pooling its resources in order that the country may compete more successfully in international racing events may be witnessed soon in England, if plans now under consideration materialize. It has been suggested that all British manufacturers who are interested in building up a better reputation for British cars, parts and accessories in foreign markets contribute to a general fund which would be used to design and build a set of racing cars capable of making a creditable showing in the big international events. The cars, it seems, would compete simply as British products, representing the entire British automotive industry and not any particular firm or firms. It is proposed to solicit contributions of £500 from each of 25 firms or individuals in order to get the plan started.

* * *

Making and Applying Marketing Plans

MARKETING plans get themselves made in two ways—at desks as the result of what appears to the executive as logical reasoning, and in small town hotel rooms as the result of distribution facts which gradually have impinged on the consciousness of similar executives during weeks or months of field work. Both ways have developed some successful methods; a combination of the two probably has developed the most successful. As we go about talking informally with automotive manufacturers in every part of the industry, we find a growing tendency to drive straight for what appears to be the direct, effective, permanent way of getting the business. Traditions, prejudices of the past, it-always-was-done-this-way-before are all having less weight in determining merchandising practices as time goes on. New methods are being tried out alongside of the old both in the field of selling automobiles and in the merchandising of parts, accessories and shop equipment. Manufacturers seem most concerned with the installation of effective, result-producing methods and only secondarily concerned with exactly who or what agency in the trade applies those methods. Other things being equal, the desire is, naturally, to utilize existing facilities to the fullest extent.

Interpretation of Company Policies

COMPANY policies, of course, must be established, but the individual interpretation of those policies in the daily activity and routine probably is more important even than the policies themselves. A fallacious policy intelligently applied by minor executives, superintendents and shop foremen is likely to produce better results than a thoroughly sound policy unintelligently transmitted. That is the reason, fundamentally, that foreman-training and industrial educational activities of various kinds holds such remarkable potentialities for good in the automotive factory. The management thus provides a means for bettering, quite definitely, the manner in which its policies are interpreted to the individuals in its employ—and after all that is the difficult part of the industrial relations job.

* * *

Important Mergers Seem Imminent

WITH the automotive atmosphere and the daily newspapers charged with mergers and rumors of mergers, and with the stocks of some of the companies involved doing acrobatics on the New York exchange, we suppose some comment along this line is to be expected of us this week. Inasmuch as we have to go to press several days before publication, however, comment becomes practically impossible. The negotiations which have been going on, not only during the last few days but also during the last few months, change color and direction so frequently that developments indicated by events up to today may be thrown entirely out of kilter by tomorrow. About all that is certain is that actual, serious merger negotiations involving important car companies have been and are under way. What the results will be—or whether there will be any results at all—cannot be accurately determined as we go to press.—N.G.S.

Higher Percentage *of* Cars This Year *Sold* for *Cash*

Reports presented at annual meeting of National Association of Finance Companies show falling off of time sales. Rebates to automobile dealers are condemned.

By John C. Gourlie

BITTER denunciation of the giving of rebates to automobile dealers on time sales transactions led to a frank discussion of financing subsidies at the annual meeting of the National Association of Finance Companies, held Nov. 14-15 in Chicago.

The linking of rebates and subsidies was considered highly illogical by some of the members, but it caused a good deal of satisfaction to many of the companies represented. Just what could be considered rebates was the central point of the debate and was responsible for most of the difference of opinion.

Aside from the revelation of the increased tendency toward rebates in some form or another, the reports presented at the conference tended to indicate that a marked decrease in the proportion of time to cash sales took place during 1927. The annual survey of the N.A.F.C., for instance, showed that 58 per cent of cars were sold on instalments up to Nov. 1, this year, as against 64 per cent in 1926. A minor gain, not considered of particular significance, was shown in the proportion of repossessions, while the average loss per car repossessed dropped sharply.

In the course of the discussion of rebates speaker after speaker arose and attacked the practice as uneconomical, a fraud upon the public, bad business for the finance companies and tending to place financing in disrepute. Each speaker declared that rebates were generally given, one estimate being that at least 90 per cent of the companies were guilty, but each maintained that his company would not consider such a way of doing business and would rather liquidate.

As in previous meetings of the group, the differences of opinion and interests between the few large national companies and the large number of local companies were freely aired. The matter came up first when the national companies, with factory connections, were accused of having started the practice of rebating by setting up reserves for dealers. These reserves, in the current plans, are retained by the finance company to apply against losses on repossessions. If the losses do not keep the reserve below a fixed percentage of the outstanding accounts, the surplus is paid the dealer.

There was some disposition to call this a rebate, but obviously there is a difference between the reserve system and an immediate return to the dealer irrespective of the losses on repossessions. The companies which set up reserves on repurchase plans regard them as necessary protection for the dealer and for the finance company. The actual return to the dealer if the plan is sound will be inconsiderable and is a reward for good merchandising and careful scrutiny of credits. In this view the reserve tends to establish sound financing and thus benefit the consumer through lower rates.

Speaking on this point, John J. Schumann, Jr., vice-president, General Motors Acceptance Corp., said that as the result of economies and better handling of credits it might be possible some day to reduce the amount of the reserve, which for the corporation is 1½ per cent on the first $500 of the note and ½ per cent on amounts in excess of this figure, on new cars, and a flat $10 on used cars. He made it plain that he was not forecasting any change in rates.

While the reserve plan in repurchase agreements was not lacking in able and influential defenders, there was nothing but criticism of reserves for dealers on no-recourse plans. Such a reserve is of course intended to be applied

What the Finance Companies Did

- ¶ *Passed a resolution condemning the practice of giving automobile dealers rebates on time sale transactions.*
- ¶ *Passed a resolution affirming the stand previously taken for standard financing terms of one-third down and the balance in 12 months for new cars, and 40 per cent down and the balance in 12 months on used cars, the terms to apply to the whole of the United States, including the Pacific Coast.*
- ¶ *Passed a resolution supporting standard terms for trucks selling for less than $1,500 and continued the committee which is studying the conditions of heavy-duty vehicle financing.*
- ¶ *Passed a resolution against financing sales of used cars where the price is in excess of the national average as determined by the Blue Book, the Red Book, etc.*
- ¶ *Reelected President E. M. Morris and other officers and directors.*

Composite Experience of a Large Number of Representative Finance Companies, Based Upon Individual Averages for One Year, as of November 1, 1927

		Passenger Cars			Commercial Cars
		1925	1926	1927	1927
Average direct loss per repossessed car*	12 or less equal monthly payments	$50	$65	$43	$46
	13-18 equal monthly payments	78	94	58	57
	Balloon note	220	158	**	**
Increase of hazard over standard terms	13-18 equal monthly payments	57%	44%	35%	24%
	Balloon note	341%	143%	**	**
Percentage of Repossessions	New cars, down payment 33.3%	1.7%	2.1%	2.7%	2.6%
	New cars, down payment 25%	3.8%	4.0%	5.9%	**
	New cars, down payment less than 25%	11.0%	11.5%	**	**
	Used cars, down payment 40%	3.0%	4.3%	5.2%	4.2%
	Used cars, down payment 35% or less	6.2%	8.6%	6.9%	**
Increase of hazard over standard terms	New cars, down payment 25%	122%	92%	115%	**
	New cars, down payment less than 25%	537%	451%	**	**
	Used cars, down payment 35% or less	105%	101%	31%	**
Average amount of note purchased	New cars	$550	$595	$574	$840
	Used cars	280	277	286	368
Percentage sold on Instalments	New cars	...	64.0%	58.0%	54.9%
	Used cars	...	...	63.1%	52.4%
	All cars	75.5%	70.0%	60.8%	53.4%
Percentage of trade-ins	On sales of new cars	...	...	72.0%	52.5%
	On sales of used cars	...	...	37.1%	22.2%
Used cars junked in per cent of those taken in trade		...	...	6.9%	10.8%
Used cars taken in trade-in per cent of new cars sold		99.0%	90.0%	116.0%	67.7%

INSTALMENT PAPER RATIOS

	1925	1926	1927
Retail paper calling for more than 12 monthly payments	18.3%	13.2%	12.4%
Retail paper calling for less than standard down payment	19.4%	9.0%	5.2%
Used car paper to total paper purchased	31.0%	33.0%	26.8%
Used car paper with recourse, to total used car paper	...	...	65.8%
Companies requiring dealers' indorsement on all used car paper	50.0%	46.0%	36.8%
Companies requiring dealers' indorsement on part used car paper	44.0%	40.0%	55.6%
Companies requiring dealers' indorsement on all or part used car paper	94.0%	86.0%	92.4%

**No cases reported, or too few to justify inclusion.

*Average direct loss per repossessed car means difference between amount owing and amount recovered from sale.

against losses to the finance company, but the return of surplus reserves to dealers was held to be distinctly unethical, a thinly disguised rebate.

Mr. Schumann revealed that G.M.A.C. is today financing about 36 per cent of the cars sold by General Motors dealers, which is equivalent to 55 per cent of the cars sold on time by the dealers. Total volume this year will be about $850,000,000, against $631,000,000 last year. On a capital of $44,000,000, the acceptance corporation will make about $8,250,000 net profit. Denying that General Motors paid any financing subsidy, Mr. Schumann said that the acceptance corporation was expected to stand on its own feet and to earn about 20 per cent net profit.

The general point of the attacks made on subsidies by the representatives of the smaller companies was that by such payments the companies with factory relations were able to bring rates below the level at which competition could be fairly carried on, and that therefore to get business the independents were obliged to give rebates or other inducements to the dealers. It was further held that if the factories understood the service rendered by the local companies they would not support plans that tended to put the local firms out of the motor car time sales picture.

A. E. Duncan, president, Commercial Credit Corp., in reply, said that so far as his company was concerned the payment was for an extraordinary service that could not be duplicated at rates which were competitive with others. His company had to handle business in sparsely settled communities at heavy cost. The Commercial Credit rates on Chryslers, he maintained, could be met at a profit in cities and other thickly settled sections.

Affirming and amplifying this viewpoint, Henry Ittleson, president, Commercial Investment Trust Corp., was careful to point out that not all national rates were subsidized.

There is a natural advantage in large aggregations of capital that the small companies might as well be reconciled to, said Mr. Ittleson. In some ways, however, the local companies have a better position and they should make the best of it without cutting rates, extending terms, or giving rebates.

The association passed a resolution condemning, in general terms and without attempt at definitions, the giving of rebates. Doubt was frankly expressed whether such a course would be effective, as the members had in mind experiences with other situations.

However this was brought about, the work has apparently been done effectively, for there has been a steady reduction in the proportion of irregular paper.

Contracts calling for more than 12 monthly payments were 12.4 per cent for 1927, against 13.2 per cent for 1926, and paper calling for less than the standard down payment aggregated only 5.2 per cent for 1927, as compared with 9 per cent for 1926. These figures are from the annual survey made by C. C. Hanch, general manager of the N.A.F.C.

Little Said About Terms

Little was said about terms at the convention, the members passing without comment a resolution affirming the standard terms previously adopted. The resolution this year, however, took in the whole of the United States, whereas last year the Pacific Coast was excepted.

For the first time the association issued figures concerning commercial vehicle time sales. The showing made by the truck paper was rather favorable in comparison with new and used car paper. A resolution was passed supporting standard terms for trucks selling under $1,500 and a committee investigating the situation was directed to study further the conditions of heavy-duty vehicle financing.

Although listed as a topic of discussion, used car merchandising and financing was not specifically dealt with at length. As heavy losses are suffered on used car paper, the problem is a rather serious one for the finance companies and they would like to see some way of bettering the situation. The only action taken was to pass a resolution to the effect that used car sales should not be financed where the price was in excess of the national average as determined by the Blue Book, Red Book, or other recognized source.

In this connection there was, in 1927, a gratifying reduction in the proportion of used car paper to the total retail paper purchased. Used car paper for 1927 is 26.8 per cent against 33 per cent for 1926.

Decline is Significant

The decline in proportion of car sales financed in 1927 as shown by the N.A.F.C. survey and confirmed by an analysis of Chrysler experience made by B. E. Hutchinson, vice-president, Chrysler Corp., one of the speakers, is apparently of considerable significance, although interpretations vary. One theory was that the public was beginning to realize the expense involved in a time payment transaction and was showing a disposition to pay cash whenever possible. Another was that the development was a natural reaction from excessive buying in 1926 of many lines of product on time. If this view is correct, a portion at least of the 1927 slump in sales must be ascribed to the inability of many who are normally instalment buyers to take on further obligations.

"There is some indication that the percentage of time payment sales is decreasing," said Mr. Hutchinson. "To what extent this is a reflection of the present relatively high degree of prosperity of this country as against a reflection of more conservative finance policies is difficult to say, but the fact of the matter is that time payment sales of Chrysler are down during the past few months about 30 per cent relative to conditions prevailing two years ago."

He commented on the need for reducing costs in view of the severe competition in the automotive business and said that this had extended to financing. Manufacturers look with disfavor upon rebates as raising the cost to the public.

"The Chrysler Corp.," observed Mr. Hutchinson, "is committed to the opinion that the control of its franchise is the basis for the conduct of a profitable business in any locality, and that the income derived does not need to be supplemented by a participation in the charge made to customers for the financing of an instalment purchase. If any Chrysler franchise holder feels that he prefers the finance business to selling automobiles, he can take down his Chrysler signs and announce his intention of going into the finance business.

"The essence of the present contract between the Chrysler Corp.," he continued, "and the Commercial Credit Co. is an engagement on the part of the credit company to purchase at an agreed rate basis without recourse paper arising from the sale at retail of Chrysler automobiles as to purchasers constituting, in the opinion of the credit company, acceptable credit risks, and to make such charges to the public for this service as the Chrysler Corp. may from time to time stipulate. This is the Chrysler corporation's present solution of the problem presented by the necessity for meeting in the automobile field the competitive situation presented by finance companies operated as subsidiaries of automobile manufacturers.

"The Chrysler Corp. scrupulously refrained from attempting to coerce its dealers into doing business with the Commercial Credit Co. It may interest you to know that of all time payment retail sales of Chrysler cars financed during the month of October, 43 per cent were handled by the Commercial Credit Co., 40 per cent by independent local finance companies and 17 per cent were either carried by dealers in their own portfolios or discounted directly with banks.

Discounts and Depreciation

Mr. Hutchinson urged finance companies to interest themselves in the discounts allowed to dealers by manufacturers, as in some instances the amount of the note exceeded the wholesale value of the car financed. Longer discounts mean heavier initial depreciation, he said, and he favored differentiated rates and terms in accordance with the make of car and the policy of its manufacturer. He continued: "Used car values have another direct interest to finance companies in that the financing of their sale presents problems of its own.

"It appears that a passenger car depreciates each year about 26.2 per cent of the value it had at the beginning of the year. It was found that its value at the end of one year was about 73.3 per cent of the original delivery cost; at the end of the second year this had shrunk to 54½ per cent; the third year to about 40 per cent; the fourth year to 30 per cent and the fifth year to about 22 per cent of its original value."

Two main advantages of no-recourse financing were seen by Mr. Hutchinson. A national finance company is able to spread its risks but local conditions may bear heavily upon a dealer who is responsible for the completion of time sales contracts. Furthermore, he said, it is desirable in this age of specialization for the dealer to concentrate on selling cars and not to be concerned with credit investigations in which his judgment is apt to be warped by the desire to complete a sale.

Milan V. Ayres presented an analysis of registration figures to show the probable future course of the replacement and new buyer markets, and David R. Forgan, vice-chairman, National Bank of the Republic, assured the finance companies of banking support so long as they kept the business on a sound basis.

All directors and officers, headed by E. M. Morris, president, were reelected. Harold Daly, Los Angeles, was made a director to fill the place of F. S. Haines of San Francisco, who resigned.

Present *Instructions* for *Running-in* New Cars Called *Wrong*

Dr. Robert E. Wilson, speaking on engine lubrication at Pennsylvania Section S.A.E. meeting, says that at 20 m.p.h. bearings are not wearing in.

By P. M. Heldt

A TALK on "Recent Developments in Connection with Engine Lubrication" was given at the November meeting of the S.A.E. Pennsylvania Section by Dr. Robert E. Wilson, of the Standard Oil Co. of Indiana.

Mr. Wilson, explaining the mechanism of bearing lubrication, stated that when a shaft without any load on it rotates in a well-lubricated bearing, the shaft is central within the bearing and is separated from the latter by an oil film all around. The layer of the film close to the shaft rotates with it at full speed; that close to the bearing adheres to it and is stationary, while intermediate layers move at intermediate speeds. There is, therefore, motion between all of the layers of the film. The only cause of loss is the resistance to shearing of the viscous film.

When a load is put on, the journal assumes an eccentric position in the bearing, the point of closest approach being nearly 90 deg from where it would be if the journal were stationary. Under these conditions there is a wedge-shaped space directly ahead of the line of closest approach, into which the oil is dragged by its adherence to the rotating journal, and it is this wedging action that keeps the journal up and out of contact with the bearing.

There are evidently two opposing forces in a bearing under these conditions, the force due to the load on the bearing, and the force due to the pressure in the oil film. The pressure which can be built up in the oil film is the greater the faster the journal rotates, and also the more viscous the oil. The question now arises—How does the pressure relieve itself?

As a certain line on the journal passes the point of closest approach, the space available for the oil gradually increases and the pressure in the film is reduced. The oil, of course, eventually escapes at the ends of the bearing. There is, however, also some return flow into the bearing at the low pressure region; if no oil is available, air sucked in may cause cavitation.

Unless very high pressure is available for forcing it in, the oil must be fed to the bearing in a region of low pressure, and this was strikingly demonstrated by Mr. Wilson by means of a moving picture of the action of an experimental apparatus. A bearing mounted on a rotating shaft so that the high pressure region was at the top, was connected by a flexible tube to a glass tube containing oil. When the bearing was moved into such a position that the inlet was at the bottom, in a region of low pressure, oil was drawn from the glass tube. On the other hand, when the bearing was turned half way around, oil was forced from the bearing back into the glass tube, the bearing then acting as an oil pump. In the olden days people were of the opinion that oil grooves were necessary to carry the oil into the bearing, but this idea has been proven fallacious. The only useful object of oil grooves is to facilitate the relief flow.

In connection with the viscosity of the oil, which also affects the maximum pressure which can be generated in the oil film, the speaker gave a demonstration of the fact that different oils have entirely different viscosity temperature coefficients; that is, two oils having the same viscosity at a particular temperature, may have entirely different viscosities at a somewhat lower or higher temperature. Two bottles, nearly filled with oil at room temperature, were inverted, and a bubble could be seen rising in each, both bubbles rising at substantially the same rate. The two bottles were then placed in a pitcher with ice water, and after the oil had acquired the temperature of the ice water the experiment was repeated. The bubble in one bottle then rose at less than half the speed of that in the other.

Now, what would happen, if the load on the bearing were increased indefinitely? The pressure in the film, of course, increases, and if the bearing surface were absolutely smooth, theoretically there would be no limit to the load the bearing could carry. There is a practical limit, however, which is due to surface irregularities. If the film becomes too thin, metal-to-metal contact occurs, the film shears and there is undue heating. If the bearing is kept running under these conditions it may seize. This indicates the im-

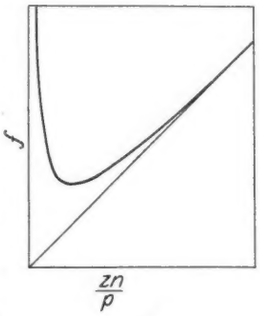
DR. ROBERT E. WILSON of the Standard Oil Co. of Indiana, who spoke on recent developments in engine lubrication at the November meeting of the Pennsylvania Section, S.A.E.

portance of having smooth bearing surfaces.

Most of the damage is done to bearings while starting and stopping, especially if starting takes place under load, which, fortunately is not the case in automobile engines. This is dut to the fact that while the machine is at a standstill the oil is squeezed out from between journal and bearing in the high pressure region.

The pumping effect of a bearing was illustrated by means of an experimental apparatus comprising a small electric motor, on the extended shaft of which between two supporting bearings was mounted a floating bearing to which a load could be applied by means of a lever. There was an oil inlet to the floating bearing at the bottom, that is, the low pressure region, and two copper tubes were inserted into holes drilled in the bearing on its upper side, the upper ends of the tubes being bent over so they would discharge into oil holes in the supporting bearings. When the motor was running, oil would be dripping from the copper tubes, and the rate of oil delivery would increase with the load applied to the bearing by means of the lever. This increases the pressure on the film at the point of closest approach and brings the journal into a more eccentric position in the bearing, thereby increasing the pumping action. This pumping action of a bearing is a very important thing at high shaft speeds, at which the circulation of the oil must be largely relied upon for carrying off the heat generated in the bearing.

Fig. 1



The efficiency of a bearing depends upon its friction coefficient *f*, which in turn depends upon numerous factors. In fact, the friction coefficient is a function of the viscosity *z* of the oil, the shaft speed *n* in r.p.m. the unit bearing pressure *p*, the bearing clearance *c*, the bearing diameter *d*, the bearing length *l*, the surface smoothness *s*, the method if lubrication *M* and the oiliness *o* of the lubricant. This may be expressed in equation form as follows:

$$f = (z, n, p, c, d, l, s, M, o)$$

None of these factors requires a definition except possibly the oiliness by which is understood that property by virtue of which one lubricant will show a different friction coefficient than another of exactly the same viscosity under similar conditions.

This equation has been investigated with the aid of the dimensional theory. The coefficient of friction *f* is a mere ratio (between two forces) and therefore cannot be expressed in terms of the three fundamental units (the foot, the pound and the second). It therefore must be a direct function of such combinations of the independent variables as constitute non-dimensional ratios. Such combinations are *zn/p, c/d and l/d.* Of these the first is by far the most important, as in any given bearing the last two are constant, and their values do not vary materially even in different bearings of good design. This leads to the important relation

$$f = \phi\, zn/p$$

If the friction coefficient *f* is plotted against values of *zn/p*, a curve of the form shown in Fig. 1 is obtained. Theoretically the graph should be a straight line passing through the point of origin; actually it is a curve following the straight line very closely as the friction coefficient approaches a critical minimum value. At this point the film breaks, and if the value of *zn/p* decreases further, which it is likely to do by reason of abnormal local heating, the coefficient of friction increases very rapidly.

From this graph it follows that there are essentially two regions of lubrication, first that of fluid film or stable lubrication, represented by the nearly straight right-hand portion of the curve, and second, that of unstable lubrication with metal-to-metal contact, which is represented by the rapidly rising portion of the curve on the left.

Fig. 2

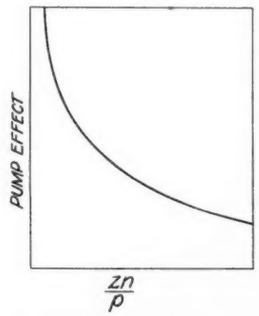
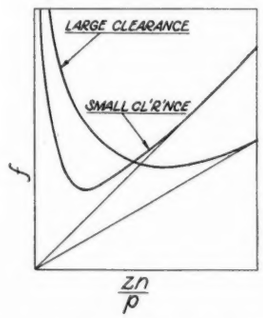


Fig. 3



It is interesting to observe that the effect of frictional heat on the friction coefficient is diametrically opposite in the two regions. In the region of stable lubrication, as heat is created by friction, the viscosity *z* decreases and the friction decreases, whereas in the region of unstable lubrication frictional heat also decreases the viscosity *z*, but this decrease is accompanied by an increase in the friction coefficient. The oil is then so thin that it will not support the load; metal-to-metal contact is established and difficulties are run into.

What can we do to decrease the friction of a given bearing? We can use a lubricant of lower viscosity and thus operate at a point lower down on the curve of stable lubrication, but this brings us closer to the critical point and our factor of safety is therefore decreased. The important thing is to know how far it is safe to go.

Method of Little Importance

The method of supplying the oil is of little importance provided sufficient is supplied to maintain a complete film. The surface condition, however, is of importance. If the bearing is roughly finished, the critical point on the friction coefficient curve will be high, and as the bearing wears down it will come down lower. It is obvious that if a given factor of safety is to be employed the bearing may be operated with a lower coefficient of friction, that is, with less power loss, if the critical point is low.

Mr. Wilson in this connection voiced the opinion that the usual instructions to car owners for running in their new cars are all wrong. At 20 m.p.h. the bearings are not wearing in, as at such speed there will be no metallic contact, and if the owner religiously follows the instructions and continues to run at the low speed for the prescribed period, and then opens the engine wide, he is about as likely to cause bearings to seize as if he had opened up at the beginning. Mr. Wilson thought a more reasonable plan

would be to open the throttle for short periods right from the beginning, or else to increase the speed gradually from the beginning. He expressed the opinion that with modern shop methods it ought to be possible to eliminate the running-in period entirely if the very lowest production cost is not absolutely essential.

The pumping capacity of the bearing is also a function of the expression zn/p, the curve of pumping efficiency having a form somewhat like Fig. 2. The greater the eccentricity of the journal in the bearing the greater the rate at which oil will be pumped, for which reason the rate of oil flow increases with the load on the bearing.

Clearance Also a Factor

The clearance also has its effect on the friction coefficient. With a small clearance the portion of the curve corresponding to stable lubrication is relatively steep and the critical point corresponds to a low value of zn/p, while for larger clearances the stable lubrication portion of the curve is less steep and the critical point somewhat higher, as shown in Fig. 3. The larger the clearance the less the effect of small irregularities in the bearing surface, but, on the other hand, if the clearance is too large, if the load is reciprocating, as it is in internal combustion engines, the bearing will be pounded out sooner.

Oiliness is of no consequence in the region of stable lubrication and becomes of importance only below the critical point. Shattering can occur only in the region of unstable lubrication. Dirt in the oil has an effect also only in the unstable region. It raises the critical point, and the rise of the coefficient of friction in the unstable region is more rapid.

Oil pumping in engine cylinders probably depends largely on the looseness of the rings in their grooves, and a piece of grit getting into the groove may change this, which makes it very difficult to get consistent results. In general, the higher the viscosity the less oil is thrown around in the crankcase. Much of the oil that is thrown on the cylinder walls and into the pistons comes down again, blackened by the absorption of carbon particles. That portion which gets onto particularly hot surfaces will distill or crack. Carbon deposition depends on the amount of oil pumped, on the temperatures of the cylinder and piston walls, and on the carbon residue of the particular oil, but it is by no means proportional to the carbon residue.

Oil pumping also has an important effect on the oil consumption. Oxidation of oils is a phenomenen which has not been studied nearly as much as it should be. It occurs particularly at high temperatures and is most serious in high-duty engines, such as aircraft engines. One effect of oxidation is the formation of a small amount of sludge or gummy material, which may stop up the circulating system. Some acid is also formed, particularly if the fuel contains measurable quantities of sulphur.

Air Cleaner Recommended

Dirt and grit are undesirable on account of their effect on the critical point. The mere use of an oil filter in the system will not keep out dirt, as most of it enters with the carburetor air. The use of an air cleaner is therefore to be recommended. Water in the crankcase presents a problem that is strictly up to the automobile engineer. Water vapor is an important component of the products of combustion in the engine, and when the engine is comparatively cold this water condenses and runs down the cylinder walls into the crankcase. Because of the possibility of sulphur in the oil or in the fuel, this is highly undesirable, as sulphuric acid will be formed which causes rapid corrosion of all ferrous parts inside the case. Another objection to water in the crankcase is that it will cause freezing of the oil screen in cold weather, to which much of the winter trouble is due. Ventilation of the crankcase, which has come into use recently, tends to eliminate the water and also keeps the dilution down.

As regards dilution, it is, of course, most serious in winter driving. There is only a comparatively small range of viscosities which will give satisfactory service in winter, ranging from about 150 to 200 Saybolt seconds at 100 deg. Fahr. If an oil of 200 Saybolt seconds viscosity is put into the engine, owing to dilution it will be below 150 seconds in about 25 miles driving and therefore too thin. On the other hand, if an oil of 325 seconds viscosity is started with, in zero weather it will be so viscous that it is almost impossible to crank over the engine. The reason is that at low temperatures the viscosity increases enormously for a slight drop in temperature. For instance, an oil which shows 200 Saybolt seconds at 100 deg. Fahr. shows from 15,000 to 20,000 at zero. Putting the matter in another way, around zero deg. the viscosity of most oils doubles for a temperature drop of 7 deg.

If one starts with an oil of 300 or 325 initial viscosity at 100 deg. Fahr., one eventually, through dilution, gets an oil which is within the desired range of viscosities, but only after much difficulty from hard starting on cold mornings. The thought therefore suggested itself, why not do in the refinery what is ordinarily accomplished in the engine in operation? That is, take an oil of comparatively high viscosity and thin it down by the addition of a certain proportion of gasoline. This led to the development of Iso-Vis, an oil in which the amount of diluent is added at the start that usually accumulates after extended service.

Piston Ring Conditions Severe

In the discussion, B. B. Bachman (who presided at the meeting), said that from Mr. Wilson's explanation of the mechanism of lubrication, the conditions of lubrication of the piston rings must be especially severe, as the greatest pressure is exterted by these rings on the cylinder walls when there is practically no motion. Mr. Wilson's reply was that this observation was correct, and that the conditions were particularly severe in the case of the top ring. The only suggestion for improvement that he could offer was to slightly round the edges of the top ring so there would be a slight wedge action and the oil would not be scraped off.

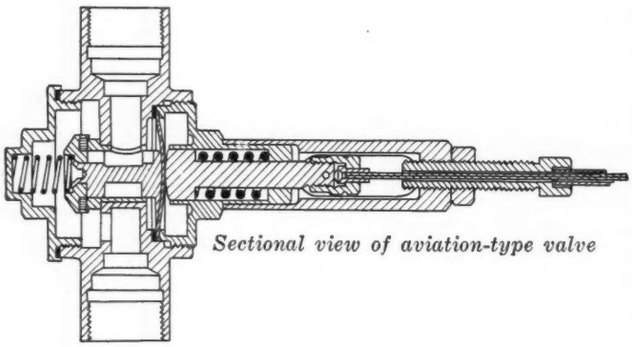
Mr. Bachman also said he had found that in practice it does not hold that the crankcase oil reaches a definite degree of dilution and then remains stable. Mr. Wilson said that the statement to this effect made by him applied to average continuous operating conditions. If a car was being used in an irregular manner the dilution would vary. For instance, if it was driven over several hundred miles at considerable speed the crankcase would get quite hot, some of the diluent would be driven off and the degree of dilution would decrease. If then the owner made a number of short trips in cold weather, in which the engine hardly warmed up, the dilution would show a material increase.

NEW DEVELOPMENTS—Automotive

Restor Gasoline Cock

APPROVED and adopted by the French commercial air service, the Restor gasoline cock has the advantages of being positive and instantaneous in its action, of being opened and closed from a distance, and of withstanding pressures as high as 45 lb. p. sq. in. The gasoline cock is also built for use on automobiles, its dimensions allowing it to be fitted in place of the usual needle valve cock on vacuum feed tanks.

As shown in the illustrations, the cock comprises a membrane seated by means of a spring loaded plunger, this plunger having connected to it a Bowden wire, the end of which is brought up to a handle and a bayonet type catch on the instrument board. Normally this



Sectional view of aviation-type valve

spring is compressed by the Bowden wire and the bayonet catch and the membrane is kept open by a light spring. On releasing the catch the heavy spring comes into action, allowing the plunger to press the membrane on the valve seat, and overcoming the resistance of the lighter spring.

As the breakage of the cable or an accidental release of the bayonet catch would close the valve and shut off the gasoline supply on the aviation-type cock, the arrangement has been reversed. Thus the breakage of the cable would cause the valve to remain open. The aviation type is also a larger size and is made of aluminum alloy instead of brass. The Restor cock provides for draining off small quantities of gasoline by means of a membrane valve in its base seated by means of a spring-loaded cap.

Atterbury High-Speed Truck

ATTERBURY MOTOR CAR CO., Buffalo, N. Y., has brought out a new truck model designated as the Big Six, of 2½ to 3-ton capacity, and designed for high-speed service such as is required in long distance, inter-city hauling.

The six-cylinder engine has 3⅞ in. bore, 5 in. stroke, full pressure lubrication and is carried in three-point suspension with rubber insulators between the frame and the engine legs. The cooling system includes a Fedders honeycomb type radiator. Drive is through a four-speed transmission and a two-piece propeller shaft fitted with three oil-tight universal joints to a Timken worm drive rear axle.

Service brakes on the rear wheels are furnished with high carbon steel drums. The emergency brake is on the propeller shaft. Pneumatic tires, 34 by 7 in., with dual rears are standard. Standard equipment includes starter, headlights, bumper, Alemite lubrication, Moto Meter, vacuum fuel tank and spare tire carrier.

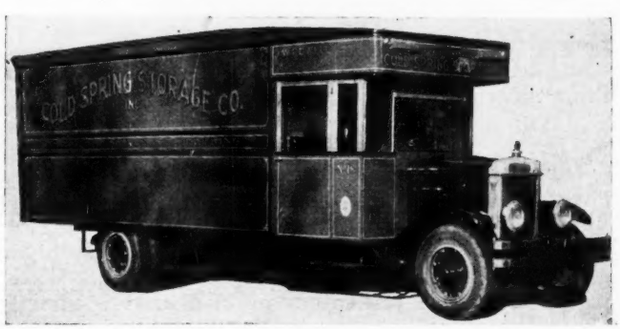
New Miller Drills

THE Miller Falls Co., Miller Falls, Mass., has recently brought out two electric, portable drills for operation on either direct or alternating current up to 60 cycles. Features of these new drills include heat-treated alloy steel gears, ball thrust bearing on the spindle, and shunted brushes that can be replaced without taking the tool apart. The tools are inclosed in an aluminum housing and are equipped with an adjustable handle and breast plate and a double-pole, double-break safety switch.

The larger drill, No. 612, employs a ½ in. Jacobs chuck and has a capacity up to ½ in. in steel and ¾ in. in wood. Its weight is 15 lb. and overall length is 20 in. Speed under load is about 330 r.p.m. Drill No. 538 has a full load speed of 600 r.p.m, is 18 in. long and weighs 13¾ lb. It is equipped with a ⅜ in. Jacobs chuck and has a capacity up to ⅜ in. in steel and ⅝ in. in wood. Both drills are driven by universal type Westinghouse motors which may be supplied in 32, 110, 220 or 250 volt capacities.

Cuno Auto-Klean Filters

FILTERS of the laminated type for gasoline and oil have been placed on the market by the Cuno Engineering Corp., Meriden, Conn. Structurally these filters consist of a die-cast metal top and a glass bowl which is held to the top by a stirrip and thumb screw, a cork gasket being interposed between bowl and top. The filtering element consists of a series of thin brass disks, stacked in a vertical pile, with separating disks between adjacent brass disks. These spacers give separations of 0.003 in., which corresponds to a 150 mesh screen. The fuel or oil enters the bowl through an inlet in the top, passes through the spaces between adjacent disks, and out through an outlet connection in the head on the side opposite from the inlet.



New Atterbury six-cylinder truck especially designed for high speed long distance inter-city service

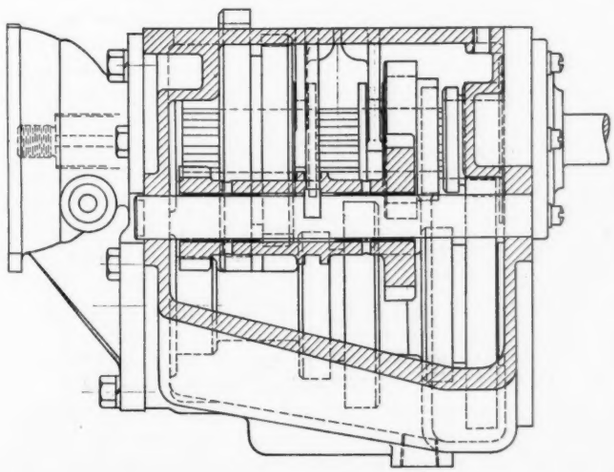
Parts, Accessories and Production Tools

Cuno Auto-Klean filter with sketch showing form of disks, cleaner blades and separators

On the hexagon stud extending down from the top just outside the pile of filtering disks are threaded very thin brass cleaning blades which extend into the spaces near the edges of adjacent filtering disks. Both the filtering disks and the cleaning blades are held between heavy gage brass washers, and the filtering disks are threaded on a hexagon stud, the top end of which is turned down to a circular section and extends through packing and a gland nut. A cross pin extending through the upper end of the stud furnishes a convenient means for rotating the filtering disks around their axis, thus causing the cleaning blades to dislodge any particles of dirt that may have accumulated on the filtering element.

It is claimed that the filter removes all dirt, lint and water from gasoline. The filtering element can be easily cleaned at any time by simply giving the cross bar at the top one complete turn. Any impurities removed can be seen at the bottom of the bowl and can be very quickly removed by loosening the thumb screw at the bottom and removing the bowl from the top.

A special model is made for installation on the vacuum tank, on the intake fuel line. To install it, all that is necessary is to remove the original intake fitting and screw the strainer in its place. The intake pipe is then connected to the filter by means of fittings supplied with the latter.



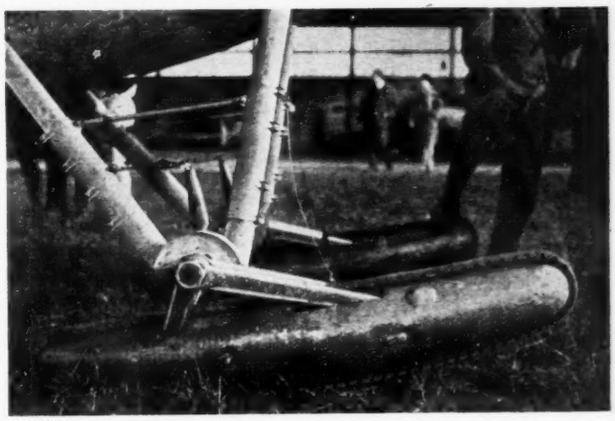
The illustration at the left shows a section through the sliding reverse gears of the Chevrolet four-speed truck transmission described in Automotive Industries of Nov. 19, page 760

Front-Drive Bus Design

IN our issue of June 4 last, in an article on front wheel drives, we gave a description of the front-drive passenger car built by Voran Automobilbau Aktiengesellschaft of Berlin. We are now informed that after long experiments with a whole series of front-drive cars the company has reached the conclusion that its drive meets all requirements. The company therefore has decided to work out special front drive designs for a number of automobile types, from a light passenger car to a heavy bus and truck, and to build the front-drive axle as a unit in such a manner that any automobile factory can use it to convert its rear-drive vehicles into front-driven ones, continuing its own engine, transmission and differential gear. The Voran company believes that this plan will make possible a more rapid introduction of the front wheel-drive on passenger cars, so that its advantages may become well known.

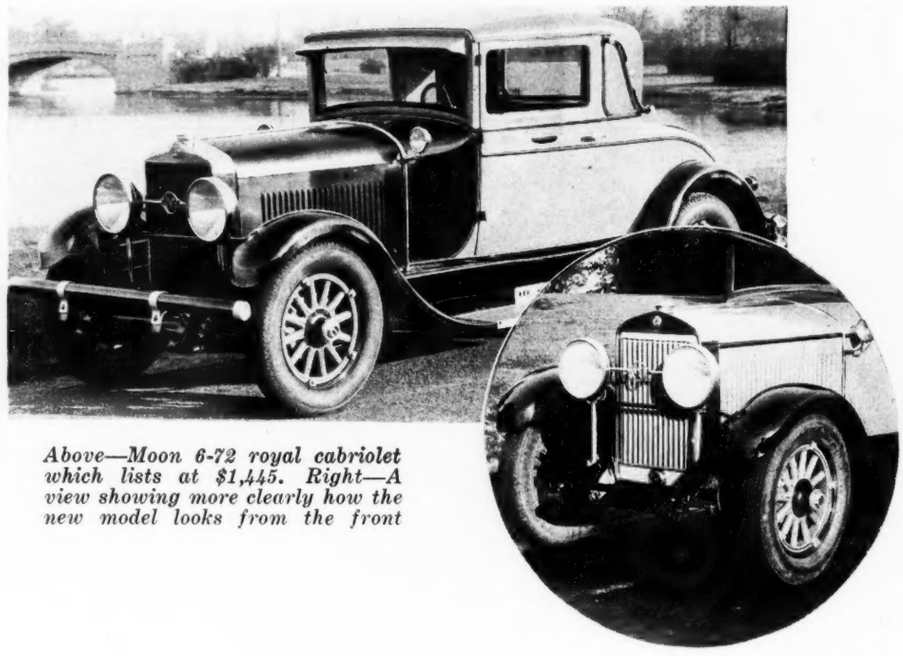
At the same time the company has started upon the design of large trucks and omnibuses and of medium speed trucks with its type of drive. The advantages of the front drive are said to be particularly striking in the case of omnibuses, so it hopes to be able to make progress in this field too. Front axle assemblies for large trucks and motor trucks will be available soon.

Creeper Track Landing Gear



Paul Peuillot creeper track landing gear fitted to airplane

SUCCESSFUL experiments have been carried out on Le Bourget aviation ground with the Paul Peuillot creeper track landing gear replacing the wheels usually employed on airplanes. The landing gear is a duraluminum construction with rubber and canvas creeper bands running over rollers and is attached at the base of the landing chassis in the place of the ordinary wheels. While the tracks are free to revolve, they can be braked either mechanically or through the use of a vacuum from the engine.



Above—Moon 6-72 royal cabriolet which lists at $1,445. Right—A view showing more clearly how the new model looks from the front

Moon Announces New Six

6-72 has more powerful engine than previous model and body lines are materially changed.

By M. Warren Baker

WITH a larger, more powerful engine and distinctive body designs the new Moon 6-72 line, with prices ranging from $1,395 to $1,545, is introduced this week by the Moon Motor Car Co., of St. Louis.

In general appearance the car differs greatly from any model previously marketed by this company. One of the principal distinguishing features is a deep and narrow cellular-type radiator with a shell of German silver. A new name plate, a filler cap of artistic appearance, and monogrammed headlight tie-rod give the car a characteristic touch.

A nickel-plated surcingle nearly an inch in width and of which the cowl light brackets are integral parts, runs over the hood and the cowl where these two units meet, and down to the sills on both sides. Headlamps and sidelamps are cone shaped and nickeled all over.

The complete line includes the royal four-door sedan at $1,545, royal two-door sedan at $1,445, royal cabriolet roadster at $1,445, royal roadster at $1,395 and the standard two-door and four-door sedans at $1,395 and $1,445 respectively.

Sedan models are finished in colors ranging from brilliant Oriental shades to the more subdued greens and grays. They are furnished with composite bodies, with the roof curving in a long sweep from metal back to the front, grace of line and contour being emphasized by the integral sun visor. Front pillars are narrow to give greater vision. The raised lance-head panel effect on the hood and cowl is also carried out in the body contours.

By means of a frame kick-up of 2¾ in. artillery wheels with 29 x 5.50 in. balloon tires, and by lower running boards, the car is given a low-hung appearance. Overall height is 73 in. and road clearance is 9 in. Full-crown fenders, newly designed dust and splash aprons, gasoline tank and spring horn covers are finished in high luster black enamel.

Optional Color Schemes

The cabriolet model is available in a number of optional color schemes. The hood and cowl are plain and are in a contrasting color to that of the body, as are the raised oval-shaped madallions on the door panels.

Interiors of the sedan models are finished in haze gray mohair with the sides giving a paneled effect through the use of cord binding. Interior fittings in the four-door sedan include silk curtains at rear and quarter windows, two silk assist cords, purse effect pockets, arm rests, silk robe rail and Butler finish hardware with black inlay.

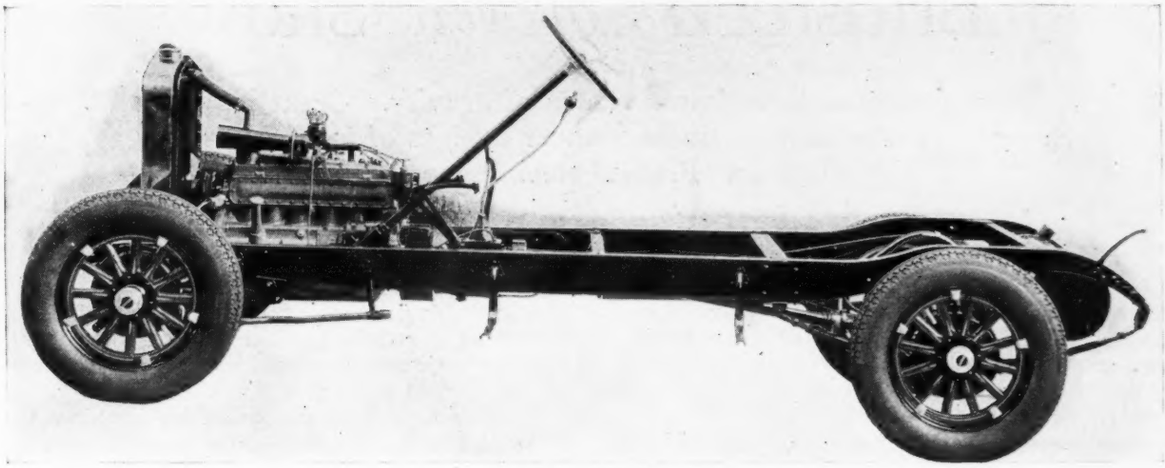
Form-fitting treatment has been given the seat backs and cushions, which are deeper and roomier. All instruments, including an electric gasoline gage and engine heat indicator, are inclosed in a single glass oval, indirectly lighted, located in the center of the instrument board. Choke and ignition buttons are located just under the oval on the instrument board. The panel in the oval is of engine-turned non-glare metal in attractive design. Instrument board panel and garnish moldings are finished in two-toned Burl walnut with ivory stripe. The thin grip steering wheel is of hard rubber with burnished aluminum spider. The accelerator pedal is of full length type. A vertical ventilating windshield is used, with the control handle in easy reach of the driver.

Interiors of both the front and rear compartments of the cabriolet and roadster models are finished in deep, buff pigskin leather.

Among the notable powerplant and other chassis features are the use of Nelson type (Invar strut) pistons, a Lanchester vibration damper, Lockheed hydraulic four-wheel brakes, semi-automatic spark advance, thermostatic water control and a "battleship" type frame braced by eight cross members. The wheelbase is 120 in., the overall length of the frame is 167½

in. and the tread is the standard 56 in. The engine has seven main bearings and works with a compression ratio of 4.9 to 1.

The engine is a Moon-Continental of 3⅜ in. bore and 4 in. stroke, giving a piston displacement of 214.7 cu. in. Its torque curve is practically flat between 900 and 1900 r.p.m., indicating 126 lb.-ft. Four-point support is used for the engine.



Moon 6-72 chassis

The crankcase is cast integral with the cylinder block, while the oil pan is of pressed steel and has an oil capacity of 6 quarts. Inlet valves are 1 7/16 and exhaust valves of 1 5/16 in. nominal diameter, and both have a lift of 5/16 in. The pistons are 3 15/16 in. long and carry four rings, the upper three being plain ⅛ in. rings and the lower a 5/32 in. oil-regulating type. The connecting rods, which have a center-to-center length of 8 1/16 in., have the lower bearings spun in and the caps fastened on by means of two chrome-nickel steel bolts. The piston pin is held in place by two retaining rings fitted in grooves at both ends of the piston, and rides in phosphor bronze bushings.

Close-limit, interchangeable, bronze-backed main bearings are used and are all 2⅛ in. in diameter. The lengths of these bearings are as follows (front to rear): 1 7/16, 1 3/16, 1 3/16, 1⅞, 1 3-16 1 3-16 and 1⅞ in. The main bearings are doweled into the crankcase, and drop-forged steel bearing caps are used. Crankshaft thrust is taken on the front main bearing. Connecting rod lower bearings are 1⅞ in. in diameter and 1⅜ in. in length.

The camshaft is mounted in four bearings of graduated diameter, to permit of its withdrawal from the front of the engine. Bearing lengths are (front to rear): 1 11/32, 2 3/32, 2 3/32 and 1 in. Diameters are 2 1/16, 2, 1 15/16 and 1⅞ in.

Front end drive is by a toothed chain running over crankshaft, camshaft and generator drive-shaft sprockets, adjustment being made by swinging the generator around its mounting.

The 1¼ in. Stromberg carburetor, known as the TX-2, has an idling and low-speed fuel jet above the throttle and a separate idling adjustment. An accelerating well supplied an extra amount of fuel for a moment after the throttle is opened, and a new type of warming up control facilities starting and improves the operation of the engine in cold weather.

Lubrication is by pressure to all main bearings, connecting rod bearings, camshaft bearings and the timing chain, while the pistons and piston pins are lubricated by splash. With the engine idling the oil pressure is 7 lb. p. sq. in. gage, and it goes up to 40 lb. when the engine speed reaches 2500 r.p.m.

The radiator is made by the Fedders Mfg. Co., and the cooling water is circulated by a pump secured to the front of the cylinder block and driven by the fan belt. Thermostatic control is included in the circulating system. The fan has four blades and is 16½ in. in diameter.

A two-unit Delco-Remy electrical system is used, with a push-pull type of ignition switch on the center of the instrument board. The starter engages the flywheel through a Bendix drive, while the generator supplies current to a U.S.L. battery located under the left front seat. The lighting switch is located under the steering wheel. John W. Brown Twin Beam headlights are used.

A Borg & Beck 10-in. single-plate clutch with rubber insulated driven member connects the engine with the Warner transmission. A Johnson type transmission lock operating from the top of the gearshift lever is provided.

Large Propeller Shaft

The Spicer propeller shaft is a welded tube of large diameter. Two Spicer universal joints complete the assembly. The rear axle is a Columbia, semi-floating type, with spiral bevel gears having a ratio of 4.9 to 1. Two bearings are provided for the overhung pinion mounting and there are three bearings on each drive shaft. The differential is of the two-pinion type and is contained within a one-piece pressed steel housing.

Hotchkiss drive is employed. Rear springs are of silico-manganese steel, and of the semi-elliptic type. Front springs are 36 in. long; rear 54 in. and both are 2 in. wide. Twelve-in. hydraulic contracting brakes are used on all four wheels, and drums being 1¾ in. wide. The contracting type emergency brake on the transmission drum has a diameter of 6 in. and is 2 in. wide. A Columbia front axle is used and the steering gear is of the Ross cam and lever type. Phosphor bronze ball thrust bearings are adjustable by means of shims.

The new Moon is equipped with an extra heavy frame made by the Midland Steel Corp. using channels 6⅛ in. deep of 5/32 in. gage stock. The chassis is lubricated by means of Alemite pressure fittings.

Fabric Sidecar *Bodies* Introduced at British *Motorcycle* Show

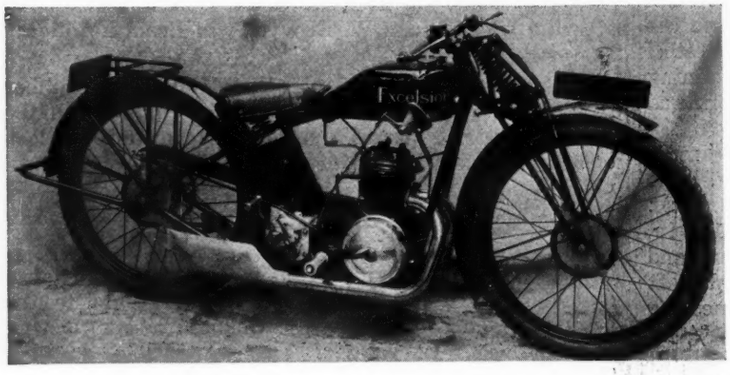
New machines have lower center of gravity. Great majority of models have single-cylinder engines of from 7 to 30 cu. in. Pressed steel frame shown.

By M. W. Bourdon

IF there is one trend more evident than any other at the British Motorcycle Show at Olympia—which is open at the moment of writing—it is the lowering of the center of gravity by redesigned frames affording a lower riding position.

In some cases the saddle height has been brought down to within 24 in. of the ground, without reduction in wheel size, which means that the saddle is appreciably lower than the top of the rear mudguards. This has necessitated the general adoption of "saddle" tanks, tapering in depth from front to rear; in many cases they are tapered in plan as well, in order to secure a reasonable capacity without too much width between the rider's legs.

Brakes are larger and nearly all of the internal expanding type; in one case, a new Rudge-Whitworth, the brake drums front and rear are of 8 in. diameter and 1½ in. wide. In this instance, too, they are interconnected, a feature that occurs on two or three other machines.



Lower riding position is a feature of the majority of British motorcycles for 1928. The machine shown here is the lightweight Excelsior with 2½ hp. engine having dual exhaust ports and two mufflers

The duplex cradle type of frame, which has relatively small diameter tubes in duplicate running from the bottom of the steering head back along each side of the powerplant to the rear wheel axle, has increased in favor, appearing in several makes for the first time, and in one case (Excelsior) in each of a series of six redesigned models.

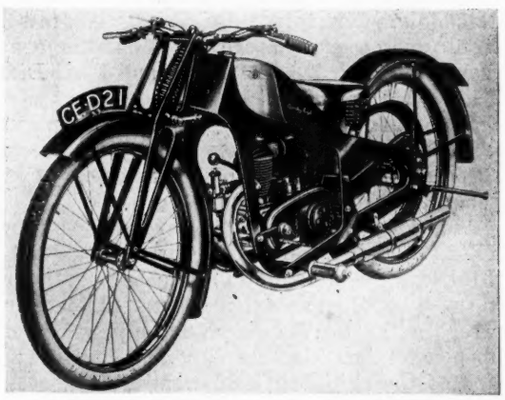
Another attempt is made to produce a pressed steel frame. This is applied to two lightweight models of the Coventry Eagle range. It promises better than previous attempts, for the frame follows the general idea of the duplex cradle tubular frame, with the result that the low standard of torsional rigidity associated with the majority of pressed steel frames hitherto cannot be charged against it.

Cellulose finish appears on British machines for the first time; it is confined to tanks in most cases, though in a few the mudguards are cellulosed as well.

Another feature of passenger car practice also makes a first appearance with motorcycles, viz.: fabric sidecar bodies. These have panels of plywood or metal with fabric in various colors and styles displacing paint.

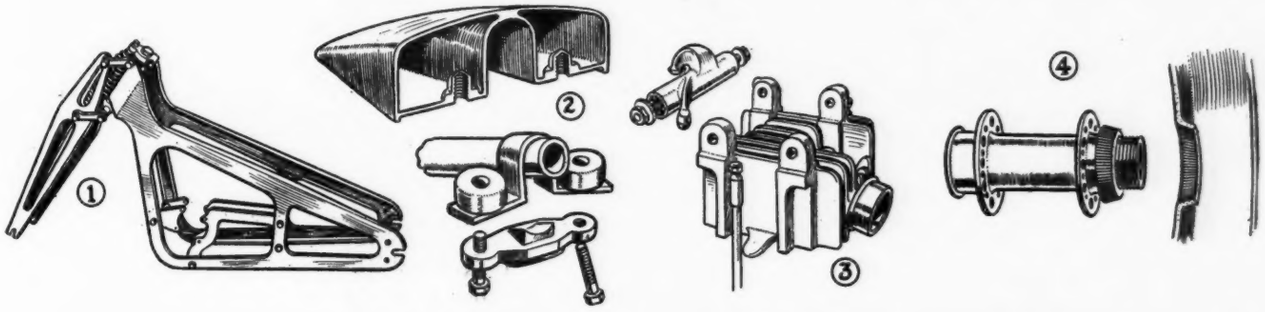
In regard to engines, the single-cylinder—two-stroke or four-stroke—again predominates and only one maker of popular priced machines on a large scale (Douglas) specializes upon two-cylinder models, these all having "flat-twin" (horizontally opposed) cylinders with the crankshaft transversely arranged.

The most popular machines are still under 30 cu. in. in piston displacement, and 95 per cent of new models come within that category. There have been further additions to the less-than-250 cc. (15 cu. in.) two-stroke models of well-known makes. Thus B.S.A. has a new model 1.74 hp. (174 cc.), two-stroke with unit-constructed two-speed gearset, priced at $139 or $149 with electric lighting and weighing 148 lb. complete. A gear drive to the layshaft is used, with a chain to the rear wheel. The frame is a duplex tubular type with no brazed joints, the latter a feature in one or two other cases, including the Francis-Barnett triangulated duplex frame in which the brazeless idea originated.



Coventry "Eagle" lightweight machine with pressed-steel frame and forks

Although B.S.A. has adopted the unit construction for this new model (the latter being one of a range numbering 13, with the largest a 9.86 hp. V twin), it cannot be said that this system has increased in popularity; one maker (Raleigh) who adopted it last year, in a 174 cc. two-speed lightweight model, like B.S.A., has discarded it in redesigning the machine to give three speeds at the same price as before, $140.



(1) Pressed-steel frame and front forks of Coventry "Eagle." (2) Mounting of "saddle" tank on Excelsior machine with rubber insulators. (3) Cylinder head of overhead valve Blackburne engine with integral brackets for roller bearings rockers. (4) Method of attaching combined brake drum and sprocket to rear hub of Douglas machines

There are four twin-cylinder two-stroke machines exhibited, viz.: the Scott, with a water-cooled engine as for many years past, the Francis-Barnett, the W. & G. (all British makes) and the German D.G.W., which made its first appearance in England at this year's International Six Days' Trial. The Francis-Barnett was shown at Olympia last year, but did not go into production until recently; it has a unit powerplant made by Villiers, the maker of the vast majority of two-stroke engines used on British motorcycles. It is a 3.44 hp. air-cooled V engine, and with a unit-constructed three-speed gearset, electric lighting, 26 x 3½ in. tires, interconnected 7-in. brakes and steering damper the price is $316.

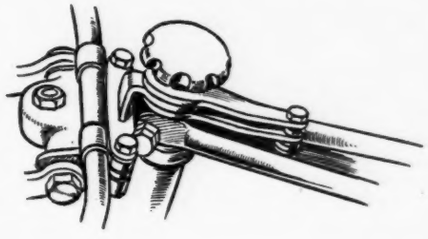
The light-weight type of machine (1½ to 2½ hp.) has secured a reputation as a practical touring solo mount and is no longer viewed as being suitable only for short journeys in urban districts or flat country. It meets with a big demand at prices ranging from $120 to $170 and is usually a two-stroke, with three speeds and chain drive. The 2½ hp. size is offered for use with a light sidecar and it is not until this size is reached that the four-stroke engine is at all widely used. As just inferred, the Villiers two-stroke is generally fitted in preference to other stock engines; it has a flywheel magneto utilized also for lighting and is now supplied with either a single or two-port exhaust, with crankcase compression in both cases. The complete machine invariably weighs less than 200 lb.

Among additional makers, besides B.S.A., who have entered this field are James, N.U.T., Zenith and McEvoy with Villiers engines, while Levis and Velocette have re-entered it with engines of their own. There is only one new model of less than 2½ hp. with a four-stroke engine (the 225 cc. Enfield), but a New Imperial with a 2½ hp. overhead valve model is offered with a guaranteed speed of 60 m.p.h.

After the light-weights of 250 cc. (2½ hp.) or less, the most popular machines are those with single-cylinder four-stroke engines of 350-500 cc. This type, in fact, may be considered the mainstay of the British motorcycle industry, and it covers the greater part of the output of such prominent makes as B.S.A., Triumph, Douglas, Sunbeam, A.J.S., Rex-Acme, Rudge-Whitworth, Humber and several others. In price it ranges from $170 to $340 or more. Sunbeam has no model under $320, but Triumph offers a side valve 494 cc. machine for $210, while the 499 cc. Rudge is $225, the latter having a four-speed gearset. In nearly all cases electric lighting is an extra, usually $25 to $30.

For the first time a British maker of high repute is showing a four-cylinder model. This is the Brough Superior, a make generally known as the Rolls-Royce of motorcycles in its normal type, a two-cylinder V. The new four is not, however, in production and will not be offered for sale until it has had another 12 months' testing (for it has been on the road several months already). It has a duplex V engine, the cylinder pairs projecting at either side of the crankcase, which is formed as a unit with a four-speed gearset embodying a bevel drive to secure chain final transmission. What the price of this model will be eventually has not been decided; but that it will be higher than that of many four-passenger cars can be judged by the fact that the corresponding two-cylinder model of 998 cc. is $828. Compared with this at Olympia is the Indian Ace of 1264 cc. at $608, with its line ahead four-cylinder engine, and the Henderson Four at $575.

Roller bearings (Timken taper pattern as a rule) have been widely adopted for wheels, but roller and ball bearings have been discarded in several cases for crankshaft journals, a return being made to plain bushings, though rollers are almost standard for connecting rod big-ends; Raleigh and New Imperial in new models have double-row roller big-ends. Aluminum pistons are extensively fitted and aluminum cylinder heads are widely found on two-stroke engines. Mechanical lubrication has become almost standard for engines of 250 cc. and upwards, but rarely is the mechanical system entirely relied upon for as a rule it is supplemented by a hand-operated plunger pump to give additional oil under strenuous conditions of running.



Combined steering lock and damper on Francis-Barnett machine

U. S. Exports of Cars, Trucks, Tires and Parts

COUNTRIES	PASSENGER CARS										TRUCKS					
	Up to $500		$500 to $800		$800 to $1,200		$1,200 to $2,000		Over $2,000		Up to 1 Ton		1 to 2½ Tons		Over 2½ Tons	
	No.	Value	No.	Value	No.	Value	No.	Value	No.	Value	No.	Value	No.	Value	No.	Value
Austria							5	$6,441			1	$917	1	$1,226		
Azores and Madeira Islands					2	$1,760							1	1,777		
Belgium			213	$107,545	471	441,304	89	101,707	36	$74,545	240	99,768	4	7,800		
Bulgaria					2	1,724	2	2,478					1	692		
Czechoslovakia			1	634	11	7,285			2	4,212						
Denmark and Faroe Is.			105	49,580	170	133,257	54	66,264	5	11,789	770	333,250	33	45,606	1	$1,890
Esthonia							2	2,470								
Finland					55	44,813	39	49,072	7	13,067	14	11,248	2	3,618		
France			6	4,188	127	107,583	66	81,873	60	136,403	32	14,688				
Germany			52	32,781	128	104,042	62	83,559	82	180,465	124	55,512	10	11,746		
Gibraltar					2	1,712	1	1,976								
Greece			47	26,887	42	34,506	5	6,200			3	2,305	8	9,476		
Hungary					18	14,533	7	8,355	5	9,602	7	5,731	2	4,201	2	5,994
Iceland					2	1,760							2	1,138		
Italy			29	14,345	47	39,168	8	9,332	5	9,734	6	2,934				
Latvia							2	2,469					1	1,170		
Lithuania					4	3,214	7	9,142								
Malta, Gozo and Cyprus Is.													2	1,578		
Netherlands			51	30,324	104	86,990	45	53,665	8	21,901			11	11,010		
Norway			10	6,403	45	37,216	18	22,163	19	45,055	6	4,673	8	17,616		
Poland and Dantzig			3	1,967	5	4,410	1	1,694	1	1,725						
Portugal			29	15,061	21	17,335	9	11,884	2	4,708	37	18,947	11	11,976		
Rumania			69	41,133	81	64,227	34	40,713	7	14,838			1	921		
Russia									1	3,146			1	1,186	1	5,402
Spain			190	109,581	320	267,970	250	285,880	42	95,053	48	24,276	150	78,605		
Sweden			12	8,599	142	117,488	61	71,033	9	15,975	32	23,991	16	19,504	2	4,915
Switzerland			7	4,992	33	29,258	8	11,350	6	14,275						
Turkey			32	16,956	10	8,141	3	3,873			18	8,262	1	1,950		
United Kingdom			15	8,257	37	31,311	45	59,423	47	111,188	409	172,724	16	22,397	20	33,009
Irish Free State					1	779	7	8,664								
Yugoslavia	1	$1,074	12	6,569	6	5,281	2	2,296			2	918				
United States																
British Honduras																
Canada	298	81,331	1,014	607,386	561	491,841	257	357,144	89	238,044	84	48,240	138	324,332	16	49,056
Costa Rica			1	690	17	13,978	13	15,108	2	3,792	3	2,644	13	15,596		
Guatemala					7	6,193	12	15,280	4	7,349	2	1,732	6	7,926		
Honduras			2	1,568	3	2,426										
Nicaragua	4	1,150	1	677	4	3,243	4	4,458					4	6,394	3	8,224
Panama	1	200	19	9,072	30	25,234	14	17,371	5	13,140	9	5,484	30	43,308	2	6,209
Salvador			4	2,635	11	10,403	8	10,097	3	5,411	2	1,718				
Mexico	191	74,433	138	85,132	133	120,166	61	83,632	5	16,417	94	51,218	35	45,479	2	7,760
Newfoundland	2	150			13	11,035	3	3,245			5	2,870				
Barbados					11	9,019	5	6,266								
Jamaica			10	5,860	20	17,534	2	2,554	1	4,241	1	1,401	6	11,138		
Trinidad					8	6,281	1	1,262			9	7,029	1	1,767		
Other British West Indies	4	1,035			5	4,262					2	624				
Cuba	17	7,030	118	62,889	115	102,914	60	76,772	6	13,582	78	44,882	36	62,963	23	58,849
Dominican Republic	22	10,300	103	55,160	23	18,426	14	16,706	2	3,686	13	6,736	4	5,858	1	1,594
Dutch West Indies					7	6,632	4	4,433			2	1,508				
French West Indies	2	991	3	1,612												
Haiti					3	2,269	5	5,786			6	4,818	5	7,776		
Virgin Islands	1	400														
Argentine	999	372,406	1,045	515,254	718	585,710	168	196,857	38	93,242	349	173,646	117	148,645	25	88,482
Bolivia					6	4,130	1	1,056					9	13,187		
Brazil	97	36,225	113	58,683	236	200,066	96	118,335	18	37,612	858	388,424	195	109,278	11	26,221
Chile			3	1,681	33	28,336	6	6,866	4	8,691	6	4,262	30	37,283	3	4,526
Colombia			6	3,855	52	41,946	63	79,518	12	27,475	12	11,689	51	74,257	4	12,992
Ecuador					3	2,580	5	6,130	3	4,911	1	1,111	2	1,772		
Falkland Islands																
British Guiana					1	794										
Dutch Guiana									1	2,951						
Paraguay					4	3,335							2	2,543		
Peru			3	1,669	25	20,755	18	20,808	3	6,248	15	10,711	20	26,534	4	3,657
Uruguay			98	47,312	98	78,611	11	16,075	3	6,322	104	46,771	23	50,560	12	57,059
Venezuela			6	3,380	23	18,598	46	48,123	11	27,452	6	10,048	9	13,550	10	25,425
Aden																
British India			23	14,665	303	247,252	21	26,893	5	9,630	141	105,122	46	38,604	1	2,950
Ceylon					22	18,637	2	2,535	1	1,651	24	16,645				
Straits Settlements			20	11,596	18	15,714	4	4,300			6	4,760	7	9,786		
China			35	21,775	18	15,861	4	4,963	1	2,150	22	16,336	8	9,121		
Java and Madura			515	248,883	222	181,150	103	110,234	6	11,895	696	328,149	8	8,845		
Other Dutch East Indies			14	7,276	18	14,975	1	2,106	1	1,851	19	12,157	2	1,212		
French Indo-China					2	1,611										
Hejaz, Arabia and Iraq					9	7,679					3	3,007				
Hongkong			11	8,161	13	11,770			1	4,500						
Japan	104	45,084	28	18,632	48	42,422	36	46,554	6	12,780	10	6,982	5	5,574		
Kwantung			7	4,848	7	6,160					7	5,034	3	3,624	1	2,092
Palestine and Syria			6	4,297	26	19,296	4	5,562	2	3,885	5	3,892	2	3,470		
Persia			5	2,375							10	4,628	2	1,842		
Philippine Islands	40	19,347	105	56,595	66	57,784	21	28,976	9	24,031	163	82,134	21	30,788		
Russia																
Siam			6	3,967	5	3,568										
Turkey	4	1,436	1	690	1	989	1	1,312	1	2,454	3	1,757				
Australia	1,329	612,899	896	438,398	596	506,905	311	348,509	57	102,902	394	221,746	350	361,685	8	20,956
New Zealand	162	59,303	322	153,720	148	123,563	54	63,162	1	2,225	4	3,767	20	35,348		
British Oceania					7	6,280							1	1,423		
French Oceania																
Other Oceania																
Belgian Congo					3	2,268					10	4,832				
British West Africa					17	14,264	6	7,009			49	28,495	310	388,271		
British South Africa	144	52,452	108	68,032	588	451,334	280	314,634	16	29,566	141	75,404	58	87,750		
British East Africa			10	5,732	22	18,119	25	28,792	1	1,871	6	5,710	11	10,733		
Canary Islands					7	5,444	5	6,349					1	1,204	2	4,685
Egypt	17	8,230	276	140,023	102	83,443	16	20,051	5	9,397	66	31,294				
Algeria and Tunis					2	2,142										
Other French Africa					3	2,381										
Liberia			1	764												
Morocco	6	3,300	1	875	3	2,808					5	4,513	4	5,680		
Portuguese East Africa			4	2,271	14	11,160	3	3,624			2	1,594				
Other Portuguese Africa			1	560			1	1,262			13	8,843				
Spanish Africa			1	880	2	1,760										
Total	3,445	$1,388,776	5,966	$3,165,332	6,348	$5,320,523	2,607	$3,144,685	667	$1,509,035	5,209	$2,584,511	1,877	$2,270,299	154	$431,947

for September, 1927 | Canadian Exports

ELECTRIC VEHICLES		PARTS	TIRES						PASSENGER CARS						TRUCKS		PARTS	COUNTRIES
			Casings		Inners		Solids		Up to $500		$500 to $1,000		Over $1,000					
No.	Value	Value	No.	Value	No.	Value	No.	Value	No.	Value	No.	Value	No.	Value	No.	Value	Value	
		$16,499	1,570	$36,118	$1,682	$6,115												Austria
		800	69	1,004	72	166												Azores and Madeira Islands
		99,752	1,514	18,505	669	1,753					22	$16,962					$10,858	Belgium
		650	40	758	4	7							2	$2,311				Bulgaria
		8,585	2,009	41,322	1,800	4,316	457	$23,312										Czechoslovakia
		128,145	4,912	57,466	3,343	8,817							10	11,448			3,622	Denmark and Faroe Is.
		297																Esthonia
		27,136	1,537	22,820	1,159	2,070												Finland
		439,070	4,458	65,664	1,693	4,127												France
		1,496,040	9,679	139,012	7,887	17,644	14	318			5	3,936	15	19,265			10,184	Germany
																		Gibraltar
		12,937	464	6,978	948	1,955	20	656										Greece
		24,562	1,020	16,408	1,225	3,044												Hungary
		588	135	2,154	139	458												Iceland
		18,724	1,953	23,406	4,267	6,255	123	4,143					7	9,771				Italy
		1,392	163	2,852	101	266												Latvia
		2,281	96	1,248	78	288												Lithuania
		572							3	$1,320	9	6,323			8	$3,442		Malta, Gozo and Cyprus Is.
		49,873	5,040	79,144	3,792	24,868	166	2,724			10	5,938	1	1,042			103	Netherlands
		21,835	1,252	19,390	1,304	2,921	14	420			2	1,318	1	1,162				Norway
		544	2,527	31,465	2,158	4,855	30	854										Poland and Dantzig
		16,103	395	4,607	160	368												Portugal
		14,714	2,805	30,472	2,173	3,265	20	568	173	72,104			2	2,311	60	23,230		Rumania
		10,187					2	194										Russia
		48,883	7,565	100,808	3,142	7,288	91	3,331									171	Spain
		72,703	3,822	64,042	2,457	6,451	4	155			15	12,854	3	3,030				Sweden
		12,629	4,877	81,871	4,033	10,468	16	1,167									607	Switzerland
		10,181	95	1,290	45	84							1	1,180				Turkey
		244,243	12,254	153,685	2,386	4,387	420	7,922	4	1,450	198	131,122	219	282,129			5,578	United Kingdom
		10,312	222	3,111	30	45											256	Irish Free State
		992	1,028	11,047	788	1,522	21	771					4	5,272				Yugoslavia
									26	5,040	3	3,000					8,877	United States
		914	4	85	4	12			3	1,320	1	566						British Honduras
4	$7,345	2,685,808	1,690	19,454	4,238	6,761	62	2,175										Canada
		4,954	147	2,408	133	352			11	4,556	1	543	1	1,404			14	Costa Rica
		10,681	445	8,035	482	1,217			4	1,818	6	4,096	3	3,468	8	3,097		Guatemala
		1,189	221	2,991	72	222	37	2,046	2	748					1	388		Honduras
		2,310	162	2,362	186	453	2	107					2	2,341				Nicaragua
		8,712	358	5,829	659	959	72	1,343	5	2,073	3	1,768	29	34,290	30	11,615		Panama
		4,194	374	5,896	319	894	72	3,901			1	591			4	1,549		Salvador
1	473	80,568	8,858	84,095	5,436	8,465	114	4,626					8	10,060				Mexico
		12																Miquelon
		3,439	117	1,424	137	257	8	284									651	Newfoundland
		4,609	90	877	18	37			4	1,758	4	2,428	1	1,073	4	2,009	62	Barbados
		21,066	91	1,034	175	760	68	1,687	13	5,265	20	17,702	2	2,167	10	4,136	186	Jamaica
		6,221	194	2,445	166	239			11	4,677	11	6,339	5	5,408	6	2,514	163	Trinidad and Tobago
		3,261	42	364	18	33			5	2,045	1	591			2	811		Other British West Indies
		65,704	12,963	142,953	10,268	17,968	643	23,699					14	16,012			18	Cuba
		19,907	2,411	33,412	1,681	4,150	58	2,903					1	1,137				Dominican Republic
		2,625	432	5,759	801	1,571	2	37	4	1,630	1	591	2	2,273	6	2,323		Dutch West Indies
		4,273	18	216	12	24	14	545	6	2,430								French West Indies
		4,070	692	10,760	696	1,535							4	4,546	8	3,097		Haiti
		346	12	132	42	80												Virgin Islands
		314,848	16,024	189,763	13,190	24,615	511	13,432	4	1,980	76	54,558	87	104,707			28	Argentine
		3,601	94	1,939	47	140			3	1,215					36	14,111	11	Bolivia
		141,892	10,284	138,816	2,461	5,592	145	3,297	47	22,525	14	9,567	2	2,678			1,056	Brazil
		29,220	2,046	32,406	2,777	5,732	24	2,077	59	24,121			1	1,192	98	38,543	7	Chile
		71,171	1,698	33,271	2,131	5,954	18	1,147	11	4,575	10	6,394	3	3,366			177	Colombia
		1,929	86	1,347	58	189					1	981	3	3,444	14	5,421		Ecuador
		17																Falkland Islands
		577	2	18					3	1,232	3	1,781					385	British Guiana
		597	16	159	36	55												Dutch Guiana
			939	5,823														Paraguay
		36,219	1,581	32,805	1,573	5,004	63	2,664	36	14,585	1	543	7	8,227	32	12,490	11	Peru
		28,016	1,471	16,641	147	321	7	332	35	16,845	16	9,693	8	11,324			2	Uruguay
		22,330	1,548	29,982	1,545	4,684	8	1,099	3	1,209			2	2,273	8	3,136	90	Venezuela
		2,855	96	1,301					2	962	1	603						Aden
		125,977	6,176	71,958	2,286	4,879	229	8,005	426	180,763	155	125,347	56	67,081	468	172,078	8,024	British India
		6,369	729	14,506	279	1,003	54	1,705	40	16,246	19	13,802	4	4,527	2	1,115	2,516	Ceylon
		41,850	1,938	19,004	693	2,007	234	2,602			9	5,436			4	2,230	32,086	Straits Settlements
		24,821	3,967	40,390	2,300	3,861	47	1,116	2	958	6	3,982						China
		67,037	2,802	30,638	1,303	2,938	47	1,673										Java and Madura
		13,443	382	3,829					34	16,314	23	19,415	49	61,204			7,588	Other Dutch East Indies
			6	123	12	45												French Indo-China
		5,355	365	3,183	790	1,350	8	118	39	17,075	2	1,210			20	7,743		Hejaz, Arabia and Iraq
		14,063							6	2,906	2	1,086	2	2,304				Hongkong
		243,218	4,375	43,377	3,647	5,480	394	5,564									3,840	Japan
		1,440	40	1,366	20	113												Kwantung
		5,277	331	4,378	184	382			6	2,874	1	591						Palestine and Syria
		12,606	895	16,616	295	648	10	296					2	2,288				Persia
		54,522	6,369	74,992	5,080	12,208	763	18,665										Philippine Islands
		10,866																Russia
		4,569							4	1,940	3	1,762					6,446	Siam
		418	101	1,441														Turkey
		203,086	4,473	93,312	1,056	3,047	1,417	32,992	200	80,598			7	8,303			25,312	Australia
		60,574	411	5,079	164	329	171	7,824	16	7,220	15	8,571	3	3,834			43,475	New Zealand
		5,435	22	217	3	10												British Oceania
		528	16	273	6	20	6	139										French Oceania
									2	856	1	1,000			6	2,492		Other Oceania
									2	936	2	1,144			10	3,920		Belgian Congo
		23,509	92	2,477	100	396			24	11,105	15	9,749	1	1,010	52	19,927	2,617	British West Africa
1	4,883	76,577	1,530	37,186	1,192	3,155	42	1,153	11	4,463	84	46,034	5	5,555			8,682	British South Africa
		21,393	353	4,946	293	695			84	33,343	85	52,027	1	1,217	88	34,123	16,275	British East Africa
		3,640	457	6,221	166	431	14	717	2	847			2	2,220				Canary Islands
		82,621	798	12,970	672	1,447	42	2,037	8	3,738			18	21,450			169	Egypt
		1,472																Algeria and Tunis
		689	52	1,915	38	175									16	6,378	96	Other French Africa
		293	159	2,044	251	497												Liberia
		4,424	885	27,601	717	3,138												Morocco
		3,619							16	6,522					10	3,878		Portuguese East Africa
		3,082	30	625	38	101												Other Portuguese Africa
		474													5	1,954		Spanish Africa
6	12,701	$7,502,611	174,461	$2,352,116	118,628	$270,503	6,804	$198,542	1,399	$586,187	857	$591,944	600	$741,304	1,016	$387,750	$200,243	Total

AUTOMOTIVE NEWS SECTION INDUSTRIES
Philadelphia, Pennsylvania
November 26, 1927

Factories Lower Operations as 1928 Programs Develop

PHILADELPHIA, Nov. 26—Automobile production, except for a small minority of factories, is now at about the low point of the year. Dealers are being allowed to reduce stocks in preparation for the 1928 selling season. The heavy pressure sales campaigns put on by several important manufacturers last month have nearly all been terminated after surprisingly good results in view of the apathetic state of the market.

Ford is one of the very few large manufacturers who are actually stepping up production. Current reports from Detroit indicate that he is sending a few complete cars out to branches and important distribution points, but unless there is a rapid acceleration of current output rates the totals are not likely to add greatly to the industry's production for the final quarter. Contracts have been let for most of the important items of equipment on the car and should mean a large volume of business for several of the equipment producers.

Additional optimistic statements on the 1928 outlook have been made by several leaders of the industry. Represented among these are men known to be conservative in their opinions and who a year ago were speaking very cautiously, if at all. If there is any serious deterrent factor upon the outlook for the industry it is the state of the used car market and of used car stocks. It is worthy of note that at least one factory upon the termination of a successful new car sales contest is starting a whirlwind selling campaign directed at dealers' used car accumulation.

Chamberlin to Build $2,500 Plane is Report

NEW YORK, Nov. 21—Clarence D. Chamberlin is reported to be organizing a company, presumably under the name of Chamberlin Aeronautical Corp., for the construction and sale of airplanes to the general public. The planes which Mr. Chamberlin plans to sell are similar in construction to those with which he has been experimenting recently and are calculated to be as nearly fool-proof as possible.

The planes will take off in 60 ft. and will land at from 10 to 15 m.p.h. The estimated price of the new planes is $2,500, which will include flying lessons.

Gardner Exceeds 1926 Output

ST. LOUIS, Nov. 23—Gardner Motor Co., Inc., reports sales of eight-in-line cars in the first nine months of 1927 exceeding the total sales in all of 1926. Dealer stocks in the last quarter are reported low.

Chevrolet Completes Parts Depot System

FLINT, Nov. 19—Opening of the the new $625,000 parts and service building of the Chevrolet Motor Co. marks the completion by the company of a $2,000,000 parts and service program extending over the last 18 months and involving in addition to construction of four major supply depots a complete reorganization of those at Oakland and Tarrytown.

Since the first of the year Chevrolet has also established complete warehousing operations at Des Moines, Memphis and Kansas City, with a new warehouse to be completed in Los Angeles, Feb. 1. The four major supply depots built in the last year and a half are at Janesville, Wis., St. Louis, Norwood, Ohio, and Buffalo.

Shock Absorber Makers Form Advertising Board

NEW YORK, Nov. 26—Shock absorber manufacturers have chosen a committee to cooperate with the National Better Business Bureau, Inc., for the elimination of extravagant and inaccurate advertising methods and for the standardization of trade practices. The selection of the committee was made by manufacturers themselves at the suggestion of the national bureau after preliminary conferences attended by the manufacturers and their advertising representatives.

The members of the committee are Guy Lemmon, Hassler Mfg. Co., Edward Rothman, Campbell-Ewald Co., representing Delco-Remy Corp., W. A. Clare, Houde Engineering Corp., G. A. Ralls, Gabriel Snubber Mfg. Co., and V. W. Dow, John Warren Watson Co.

Hagan Gets F.I.A.T. Contract

PITTSBURGH, Nov. 23—The George J. Hagan Co. has received a contract from F.I.A.T., Turin, Italy, for one four-chamber counter flow pusher type carburizing furnace, three rotary hearth furnaces and one four-chamber car type furnace. The equipment will have a connected load of 150 kilowatts.

Germany Increases Parts Import Duty

WASHINGTON, Nov. 21—A change on the tariff duty of certain automobile parts imported into Germany has been announced by the tariff division of the U. S. Department of Commerce. Effective at once, the department announces, the duties on automotive assembly parts, frame, radiator, adhesion couplings, change speed gears and casings therefor; universal joints, differential gears, and casings therefor; brake and steering gears, will be increased. Under the new German tariff law, the new rates are 100 Reichmarks per 100 Kilos.

L. T. White is Elected President of N. S. P. A.

CLEVELAND, Nov. 19—The new officers of the National Standard Parts Association are: President, L. T. White, Raleigh, N. C.; vice-president, W. E. McIlroy, New York; jobber directors: E. P. Rotzell, one year, Philadelphia; Earl A. Henderson, three years, Sacramento; R. A. Kiken, three years, Chicago; M. H. Rykoski, three years, New Orleans; manufacturer directors: J. C. Gay, three years, Los Angeles; Fred S. Durham, three years, Allentown, Pa.

115,050 Cars Are Tested in Maryland Campaign

BALTIMORE, Nov. 23—The Save-a-Life campaign conducted in Maryland from Oct. 24 to Nov. 12 has had some excellent results. A total of 115,050 cars were tested and more than 36 per cent needed adjustments of some kind, it was announced. Of the total inspected 73,210 were found to be in safe condition. It was found necessary to adjust brakes on 16,541 cars, or 14 per cent and brakes were relined on 5749, or 4½ per cent. A marked improvement in lighting systems was reported as a result of the campaign.

Synthetic Rubber Delayed

NEW YORK, Nov. 21—Advices from Germany state that the newly developed synthetic rubber cannot be placed on the market for another year or two. Production on a commercial scale still awaits the solution of several technical difficulties, according to a statement made by Dr. Arthur von Weinberg of the I. G. Farbenindustrie Directorate.

Ford Centers Effort on Production Plans

Presentation of New Car Not Affected by Recent Personnel Changes

DETROIT, Nov. 23—The resignations of the heads of the Ford Motor Co. buying and service departments during the past week leaves its production department as the only one without important and recent personnel changes and is regarded here as an indication that the company is centering its main effort on production of the new models.

The resignation of Earle P. Hobart as service manager followed closely on that of Fred P. Diehl as purchasing agent. There remain well organized service and purchasing departments which are largely the result of the labors of the two resigning executives over the past 20 years but for the present at least these departments are functioning under the production department.

With the Ford company now producing the greater part of all its materials and supplies the importance of the purchasing department has been greatly reduced and it is regarded as likely that its consolidation as part of the production department may be permanent. Sales policies on the new car will determine to a large extent the development of the service department in the future.

Parts Delivered on Coast

SAN FRANCISCO, Nov. 21—In spite of the fact that, up to Nov. 14, no samples of the new Ford have arrived on the Pacific Coast, the Ford steamer, "Onondaga," loaded with parts for the new car, arrived in Seattle, Nov. 11, discharged her cargo consigned to the assembling plant there, and went on berth for a load of lumber to East Coast ports. Reports that Ford would put another steamer on the same run, to carry the new Fords and parts to the Pacific Coast, and return with cargoes of lumber, accompanied the "Onondaga" to Seattle. No definite information as to the arrival of the new Ford had reached San Francisco dealers up to Nov. 14.

Columbia to Make Coast Tires

PORTLAND, ORE., Nov. 21—Report that Columbia Tire Corp. had discontinued making Ford tires was due to the suspension of Ford manufacture pending perfection of the new model Ford. As soon as Ford begins assembling on the coast, Columbia will resume manufacture, as contract for equipment has not been disturbed.

Graham Exports at Peak

DETROIT, Nov. 21—Exports of Graham Brothers trucks in the first 10 months of 1927 totaled 9016, the largest for any similar period, the truck division of Dodge Brothers, Inc., reports. Sales in Canada increased from 821 in 1926 to 1007 this year, the largest proportionate export gain. Exports for the year to date comprise 18.9 per cent of the total output as against 14.5 in 1926. October sales totaled 6125, a new record and sales in the first 12 days of November were 2983 against 1826 for the same period last year.

M. & A.M.A. Index Leads October 1926

NEW YORK, Nov. 22—The automobile parts and accessory business during October showed a recession from September, although the average for all divisions was ahead of October a year ago, according to the monthly report of the Motor & Accessory Manufacturers Association.

The decline since September was due primarily to the hesitancy of the market to buy accessories and service equipment as long as Ford dealers are temporarily out of the market.

The average index for all divisions for October was 129 as against 120 in October a year ago, and 146 in September of the current year. The index figure for original equipment in October is 124 as against 139 in September and 125 a year ago.

Replacement parts has shown a steady advance since July 1 of the current year and the index figure for October is 174. The figures for accessories and service equipment are 103 and 120, respectively, as opposed to 163 and 127 in September.

Tire Plants Increase Shipments to Ford

AKRON, Nov. 21—Although there has been no marked change in automobile output recently, indications are that factory production is again on an upward trend. Akron factories are turning out upwards of 130,000 automobile casings a day, representing a gain of about 10 per cent over the production level of a month ago.

It is learned that the Firestone, Goodrich, and Mason plants are shipping thousands of tires to Ford Motor Co. for use on the new car.

Retail sales of tires have been stimulated to some extent by the recent reduction in prices.

Tunnel Tolls $71,076 in Week

NEW YORK, Nov. 21—The Holland vehicular tunnel was used by 136,303 vehicles during the first six days of its operation. The tolls during that time amounted to $71,076. Nearly 40,000 vehicles made use of this tunnel during the second Sunday it was open. During the hours from 2 to 6 on Sunday afternoon, more than 2000 automobiles per hour passed through each of the tubes.

Business in Brief

Written exclusively for* AUTOMOTIVE INDUSTRIES *by the Guaranty Trust Co.

NEW YORK, Nov. 24—The current ease in the credit situation has been further emphasized during the past week by the rise in bond prices to new high levels and the establishment of a new record total of brokers' security loans. Exports of merchandise in October of $490,000,000 were the largest in two years, while imports totaled $356,000,000. The credit balance of trade so far this year is approximately three times as large as in the same period of 1926. Warm weather in the past week has hindered retail trade, though the stimulus of the holiday buying season is being felt in most sections. Wheat has advanced in price on the basis of unfavorable news from the Argentine, while cotton has declined in response to better crop conditions. Corn has been stronger. Commodity prices as a whole are slightly firmer.

FREIGHT CAR LOADINGS

Railroad freight car loadings in the week ended Nov. 5 declined, numbering 1,038,852, as compared with 1,112,621 in the previous week and 1,131,832 in the corresponding period a year ago. Total loadings so far this year amount to 45,498,277 cars, as against 46,233,548 cars in the same period last year and 44,492,749 cars two years ago.

PETROLEUM PRODUCTION

Production of crude petroleum rose during the week ended Nov. 12, average daily output for that period being 2,469,500 bbl., which compares with 2,453,450 bbl. a week earlier and 2,466,550 bbl. in the corresponding period a year ago.

FISHER'S INDEX

Professor Fisher's index of wholesale commodity prices rose fractionally to 145.9 last week, as against 145.7 in the previous week, and 146.2 four weeks earlier.

BANK DEBITS

Bank debits to individual accounts, as reported to the Federal Reserve Board for the week ended Nov. 16, were 22.9 per cent above the total of the preceding week and 23.6 per cent greater than the amount reported in the corresponding period of 1926.

FEDERAL RESERVE REPORT

For the same period the Federal Reserve banks reported that reserves declined $14,900,000, discounts $93,200,000, open market purchases $2,600,000 and note circulation $28,300,000. U. S. Government securities rose $174,600,000 and deposits $142,700,000.

Time money and commercial paper rates remained unchanged last week at 3¾ to 4¼ per cent and 3¾ to 4¼ per cent respectively.

Time Sales Potent Agency in Prosperity, Says Seligman

Has Developed Many Factors Favorable for Business Without Creating Added Danger in Depression Period, He Tells Industry Leaders

NEW YORK, Nov. 19—Thorough endorsement of the principle of retail instalment selling was given this week by Prof. E. R. A. Seligman of Columbia University at a dinner in his honor by John J. Raskob, chairman of the finance committee of General Motors Corp. Professor Seligman's views were a result of a 15 months' investigation into time sales practices, with the assistance of a large staff of associate economists.

Instalment selling, said Professor Seligman, has proved itself one of the most potent agencies in establishing the new prosperity of the United States. It has increased production, stabilized output and augmented purchasing power without creating any particular added danger in time of depression.

Referring to the instalment investigation, Mr. Raskob said that it had been made at the invitation of General Motors and that Professor Seligman had been given a completely free rein in forming his conclusion.

Out of a total commodity turnover of $38,000,000,000 in 1926, Professor Seligman estimated that $4,500,000,000 was sold on time. Such a figure would mean that there was approximately $2,000,000,000 worth of consumer credit paper outstanding at any given time.

Consumer Credits More Liquid

"There are no greater risks attending consumers' credits than producers' credits," he declared, "if properly administered, and they are, in fact, more liquid. Frozen credits are not a concomitant of instalment selling. The theory that a business depression would be considerably aggravated by outstanding consumers' credits is not confirmed by investigation. An elaborate study of the situation in a period of almost complete depression caused by the coal strike in eastern Pennsylvania a few years ago showed that there was even an advantage in instalment credit over general bank credit. It showed it is precisely in bad times that bankers are compelled to continue to extend credits of doubtful soundness, whereas in instalment credit the volume of outstanding paper diminishes constantly.

"Protracted investigations showed that the losses connected with instalment paper are very small, that in the proper administration of the system the finance company should be a dispenser of credit and not a seller of automobiles, which lends force to the principle and brought forth the conclusion that the only legitimate system is the recourse one, that in which the seller accepts responsibility for the credit."

Professor Seligman pointed out that the principle of partial payments is very old, and that its earlier applications had been met with much the same criticisms which are now made with regard to consumer credit. The same principles followed in all credit practice apply to credit advanced to the consumer, the instalment payment device being simply a practical means of liquidation of the credit to make it available for the ultimate consumer.

Logical Credit Development

He traced the development of banking and production credit down to the present day of individual credit, which he regarded as the logical extension of the previous systems.

Touching upon another controversial point, Professor Seligman took up the charge that luxuries are too often sold upon credit, but he expressed the opinion that a luxury is a relative thing and that a high standard of living does not necessarily mean luxurious living.

"Economists," he said, "have in modern times been making intelligible what is known as the economy of high wages. High productivity, high efficiency, high standard of life go hand in hand with inventive ingenuity, with increase of capital and with augmented prosperity. In this process no small part is played by the gradual transition of commodities from the category of luxuries to that of comforts and necessities. The luxury of one age becomes the necessity of the next.

Not Wasteful Consumption

"While it is undoubted that in the case of the automobile there have in individual cases been very decided resultant evils, yet on the whole we cannot regard the automobile as a type of foolish and wasteful consumption. Few would dispute the statement that the advent of the automobile has marked a revolution in economic and social life comparable to that produced by the introduction of the railway, and that in the one case, as in the other, we must weigh up the evils with the benefits, with the conclusion that there is little doubt as to where the balance of advantage lies.

"Instalment selling," said Professor Seligman by way of emphasizing its positive merits, "has increased production, stabilized output, reduced production cost and increased purchasing power. The instalment plan induces the consumer to look ahead with greater care and to plan his economic program with a higher degree of intelligence. It not only tends to strenthen the motive which induces an individual to pay but also influences his capacity to do so.

"Instalment credit is beginning to do for the consumer what the gradual development of the commercial banking system has done for the producer. If the credit is restricted to the proper commodities, under proper management, it will gradually throw off its abuses and will stand forth as one of the most signal contributions of the twentieth century to the potential creation of national wealth and national welfare."

Professor Seligman declared that the extent of the instalment selling practice had been exaggerated, his investigations tending to show that only about 60 per cent of automobiles were sold on credit. He believed the recourse plan to be best in automobile instalment selling because the finance company was thereby divorced from the merchandising of motor cars.

Automobile Men Attend

Among the many well known men of the industry at the dinner were Alfred P. Sloan, Jr., president, General Motors Corp.; A. H. Swayne and Fred J. Fisher, vice-presidents; Charles W. Nash, president, Nash Motors Co.; A. J. Brosseau, president, Mack Trucks, Inc.; F. C. Chandler, president, Chandler-Cleveland Motors Corp.; Roy D. Chapin, chairman, Hudson Motor Car Co.; Col. Charles Clifton, chairman, Pierce-Arrow Motor Car Co.; A. E. Duncan, chairman, Commercial Credit Co., Baltimore; Pierre S. du Pont, chairman, General Motors Corp.; H. S. Firestone, president, Firestone Tire & Rubber Co.; George M. Graham, assistant to president, Willys-Overland Co.; Alvan Macauley, president, Packard Motor Car Co.; Alfred Reeves, general manager, National Automobile chamber of Commerce, and Henry Ittleson, president, Commercial Investment Trust Corp.

Moon to Present Eight

ST. LOUIS, Nov. 23—In addition to the new 6-72 six-cylinder model which is being introduced this week, the Moon Motor Car Co. states that it will soon bring out an eight-cylinder model. Advertisements which are appearing this week in automobile dealer publications say that the eight-cylinder engine will have an output of 87 hp. and will be of the high-compression, dual-carburetor type, giving the car a speed of 80 m.p.h.

Tiffany Joins Durant

NEW YORK, Nov. 23—H. C. Tiffany has been appointed general manager of advertising and sales promotion, Durant Motors, Inc. Mr. Tiffany was assistant manager of sales promotion, Durant Motors, Inc., 1922-1924.

Campaigns Swell G.M. October Sales

Much November Business Included, Says Sloan, Predicting Current Month Drop

NEW YORK, Nov. 19—Presenting General Motors sales report for October, A. P. Sloan, Jr. president, said: "Specific attention is called to the fact that the October sales are larger than would normally be expected and in excess of current sales trend having been influenced by aggressive sales campaigns, tending to advance into October business that would otherwise have been consummated in November. Therefore, sales for November may be expected to be adversely influenced this year and may even be less than the corresponding month a year ago as similar campaigns were carried on last year during the month of November."

Comparative figures for 1927 and 1926 are as follows:

Dealer Sales

	1927	1926
Jan.	81,010	53,698
Feb.	102,025	64,971
Mar.	146,275	106,051
Apr.	180,106	136,643
May	171,364	141,651
June	159,701	117,176
July	134,749	101,576
Aug.	158,619	122,305
Sep.	132,596	118,224
Oct.	153,833	99,073
Total to date	1,420,278	1,061,368

Divisions Sales

	1927	1926
Jan.	99,367	76,332
Feb.	124,426	91,313
Mar.	161,910	113,341
Apr.	169,067	122,742
May	173,182	120,979
June	155,525	111,380
July	136,909	87,643
Aug.	155,604	134,231
Sep.	140,607	138,360
Oct.	128,459	115,849
Total to date	1,445,056	1,112,170

Syracuse Registrations Show 7.8 Per Cent Drop

SYRACUSE, Nov. 21 — Passenger car registrations in Onondaga County for October show an increase of 12.4 per cent over the same month in 1926. The total for the ten months ended Oct. 31 was 7407, a decline of 7.8 per cent as compared with the same period a year ago. The monthly record of passenger car registrations follows:

	1927	1926
January	190	119
February	450	281
March	1126	992
April	1385	1692
May	1030	1409
June	733	807
July	919	1060
Aug.	648	733
Sept.	417	487
Oct.	509	453
Total	7407	8033

Ten Months' Output Decreases 756,265

	Cars	Trucks	Total
1926			
Jan.	284,703	31,388	316,091
Feb.	334,524	38,754	373,269
Mar.	399,105	45,996	445,101
Apr.	401,836	50,189	452,025
May	394,569	47,576	442,145
June	358,388	43,735	402,123
July	329,959	39,643	369,602
Aug.	393,064	44,515	437,579
Sept.	363,547	47,304	410,851
Oct.	300,160	43,652	343,812
Total	3,559,855	432,743	3,997,598
Nov.	226,278	34,500	260,778
Dec.	143,413	27,768	171,181
Total	3,929,546	495,011	4,424,557
1927			
Jan.	208,734	40,873	349,607
Feb.	275,470	41,950	317,420
Mar.	360,765	48,699	409,464
Apr.	374,113	48,275	422,388
May	374,419	46,963	421,382
June	290,188	43,003	333,191
July	242,144	32,249	274,393
Aug.	281,464	34,102	315,566
Sept.	233,694	35,145	268,839
Oct.	191,942	37,141	229,083
Total	2,832,933	408,400	3,241,333

Ohio Sales Disclose Decline in October

COLUMBUS, Nov. 21—The report of county clerks in five of the most populous counties in the state covering sales of new cars in the month of October, show a falling off from the records of the previous month. This condition prevails over the entire state.

In Cuyahoga County, containing the city of Cleveland, there were 1671 new cars sold in October, compared with 1889 in September; 962 new cars sold in Hamilton County in October, compared with 1035 in September; 720 cars in Franklin County in October, compared with 693 in September; 502 cars in October in Summit County compared with 590 in September; 506 cars in Lucas County in October, compared with 548 in September.

British Timken Active

CANTON, OHIO, Nov. 22—Between 800 and 1000 skilled workmen are now employed in the British Timken Ltd., plant in England, controlled by the Timken Roller Bearing Co., according to executives. The organization is on a large production basis now and the output is being distributed in European countries.

Gardner Orders 500 Bodies

ST. LOUIS, Nov. 22—Gardner Motor Car Co. has placed an order for 500 automobile bodies with the Limousine Body Co. of Kalamazoo, which was recently acquired by the Auburn Automobile Co. Deliveries are to start this week.

October Production Shows 229,083 Total

Month's Output is Lowest of the Year—No Ford Figures Shown

WASHINGTON, Nov. 21—Production of cars and trucks in the United States and Canada for October totaled 229,083 according to the regular monthly report of the Department of Commerce. This total includes only production by member companies of the National Automobile Chamber of Commerce and exceeds the earlier estimate by 18,618. Though Ford Motor Co. is understood to have built some cars during October, they were not reported and do not show in the Department of Commerce total.

The October output in both the United States and Canada was the lowest for any month in 1927. Passenger car output in the United States was 185,706 as against 224,859 in September and 289,565 in October last year. Truck output totaled 35,586 against 32,605 in September and 39,577 in October, 1926.

Passenger car output in Canada in October was 6236, which compares with 8681 in September and with 10,595 in October last year. Canadian truck output was 1555 against 2581 in September and 4075 in October last year.

Passenger car output in the United States for the first ten months of 1927 is brought to 2,694,570, which compares with 3,408,194 in the 1926 period; truck production totals 378,345 as against 396,874. Canadian passenger car output for 10 months is 139,420 as against 151,657 in 1926, and truck output 29,954 against 35,855.

Auburn Shipments Show Increase of 133 Per Cent

NEW YORK, Nov. 19—Auburn Automobile Co. reports shipments of 815 cars in September, 616 in October and an estimate of 612 in November, making an estimated total of 2027 for the third quarter of its fiscal year compared with 508 cars in September, 1926, 216 in October and 144 in November, making a total of 868 cars, an increase of approximately 133 per cent over the same period last year.

Actual registration of Auburn cars throughout the United States for the nine months ending Sept. 30, 1927, was 8504 as compared with 5480 in the same period last year and 2972 for the same period in 1925.

Visit G.M. Proving Ground

CINCINNATI, Nov. 19—Leaving on a special train, 120 Buick dealers from southern Ohio, Kentucky and West Virginia, attached to the Leyman-Buick organization, visited the General Motors proving ground and the Buick factory at Flint last week as the guests of the Leyman-Buick Co.

Men of the Industry and What They Are Doing

Conditions Abroad Favor Better Market Says Nash

C. W. Nash, president of Nash Motors Co., who has just returned from the Paris and London Automobile shows, sees every indication of a growing market for American-made automobiles abroad. Improved economic conditions, particularly in England, France, Germany and in the Scandinavian countries, together with the development in Europe of good roads, are cited by Mr. Nash as reasons for a growing demand for the motor car.

"In France, for example," said Mr. Nash, "there are 40,000,000 persons and only about half a million automobiles, as contrasted with over twenty million cars in America for a population of 110,000,000. This same ratio applies pretty generally throughout Europe and so the potential market for automobiles is very large indeed.

"Financing automobiles for the retail buyer, in my opinion, is another factor that will help in the development of the European market; the 'time payment' method of buying which long since has been recognized in America as sound business procedure, is just now coming into general practice throughout Europe and I can see no reason why it should not be equally successful there if the plan is handled on a sound and business-like basis.

"From a close study of the mechanical details of foreign-built motor cars exhibited at Paris and London, I am not afraid to say that America has kept thoroughly abreast of Europe with respect to body styles and mechanical improvement.

"Another fact that impressed itself upon me regarding the outlook of the European market for American-built automobiles is the almost total absence of an unfavorable used car situation there."

German Sees Export Gains

Belief that Europe will use from 25 to 30 per cent more American made automobiles in 1928 than it did in 1927 was expressed by Leon R. German, vice-president of the Peerless Motor Car Corp., upon his return from a seven-weeks' tour of the continent. He was accompanied by Walter Zimmerman, export manager.

"Economic conditions in Great Britain are good and getting better," Mr. German said. "France, where the market for American cars was temporarily curtailed by high tariffs, and Germany hold the best economic positions of all European countries. American cars are gaining a further foothold in England despite the campaign of British manufacturers to induce Englishmen to use British made cars. In France and Germany sales are affected by lack of credit facilities.

Payne Urges More Intelligent Sales

Greater and more intelligent selling effort was urged by Col. Frederick H. Payne, president of the Associated Industries of Massachusetts and of the Greenfield Tap & Die Corp., in an address before the Third New England Conference at Springfield, Mass. "We analyze our production costs," he said, "but the analysis of sales costs is a comparatively new idea. We should make our sales efforts intensive and specific. A great many manufacturers are not sufficiently sold on advertising, which is a part of merchandising and selling. With quality goods and instant service the question of price is not so important as many of us have believed. The concern that can make the finest quality at the lowest cost is bound to succeed. While competition is the life of trade it should be economically fair. One of the best ways to arrive at that goal is through education in cost accounting to teach producers how to determine fair selling prices."

Zens Urges Conservatism

Paul Zens, vice-president of the Jordan Motor Car Co., who has just returned from an extensive business tour of Europe, sees a great future there for American automobile manufacturers if they follow a conservative course. American cars have made a profound impression, he said, and are in strong demand because of their ruggedness and unusual performance. The Paris salon, he said, showed a marked tendency toward American chassis and body design on the part of European manufacturers. European dealers are facing the same used car and time payment problems faced by dealers here and over-production or undue forcing of the market is apt to cause a slump in the export market, Mr. Zens declared.

Loomis Addresses Meetings

Edward F. Loomis, secretary of the motor truck committee of the National Automobile Chamber of Commerce will speak before the annual meeting of the Minnesota Commercial Truckmen Association to be held in St. Paul on Dec. 7. He also will address the Reo Truck Salesmen Institute in Lansing on Dec. 9.

Graham Brothers Named On Distributor Board

The Paige-Detroit Co. of New York, distributor of Paige cars in the five boroughs of New York, parts of Connecticut, New Jersey and New York State, has changed its name to the Dalley-Jennings-Graham Corp.

E. M. Dalley continues as president, L. C. Dalley as secretary, and S. R. Bell as treasurer. C. H. Jennings, formerly Dodge dealer in New York, has joined the corporation and becomes its vice-president. Ray A. Graham and his two brothers, J. B. and R. C., have become directors in the new New York company.

Coolidge Gets Hughes Medal

Dr. W. D. Coolidge, assistant director of the research laboratory of the General Electric Co., has been awarded the Hughes medal by the Royal Society for "distinguished work on X-rays and the development of highly efficient apparatus for their production." The Hughes medal was first presented in 1913 to Dr. Alexander Graham Bell, Dr. Irving Langmuir, also of the General Electric research laboratory, received it in 1918.

Jacobs Heads Buick Service

C. W. Jacobs, head of the service department for the Pence Automobile Co., Minneapolis, Minn., has been made head of the service department at the Flint factory of the Buick Motor Co. He had been with the Pence company 10 years and the department head since 1922. He was graduated from the engineering school at the University of Minnesota and for several weeks had been at the factory.

Hughes Heads Steel Treaters

Frederick G. Hughes, vice-president of the New Departure Mfg. Co., is the new national president of the American Society for Steel Treating. Mr. Hughes has been connected with New Departure for 17 years, serving as chief engineer, production superintendent and assistant general manager. He was elected vice-president in 1922.

Fisher and Bitting Named

Fred J. Fisher and Clarence R. Bitting, representing the Fisher & Co. interests, have been formally elected to the board of Baldwin Locomotive Works, following the authorization by stockholders of an increase in the size of the board from 12 to 15 members.

Burgess Heads Ambridge

J. I. Burgess, formerly of the National Acme Co., Cleveland, and more recently sales manager of the National Pipe Products Corp., Rochester, Pa., has been elected president of the Ambridge Tool & Die Mfg. Co., Ambridge, Pa.

Val Haresnape Now Stutz Zone Manager

Leaves Contest Board to Resume Sales Work—Other Managers Named

INDIANAPOLIS, Nov. 21 — Four new district sales managers have been added by Stutz Motor Car Co. of America, Inc., in an expansion of its sales program and a redivision of its sales territory. The appointments were made by Col. E. S. Gorrell, vice-president, and are headed by Val Haresnape who has resigned as executive secretary of the contest board of the American Automobile Association.

Mr. Haresnape's district includes Maryland, New Jersey, Delaware, District of Columbia and upper New York. Previous to joining the A.A.A. he was manager of the Los Angeles retail merchants' association and had been active in sales capacities in other industries.

J. C. Thorpe will have charge of the Pennsylvania territory; Herbert L. Clay, California, Nevada, Washington, Oregon, British Columbia and lower California, and Kelly R. Jacoby, western Missouri, Kansas, Oklahoma and Texas.

Mr. Thorpe has been a distributor and was manager of the National Automobile Trade Association prior to the formation of the National Automobile Dealers' Association. Mr. Clay has been an automobile representative on the coast and for two years was in charge of distribution at the Stutz factory sales department. Mr. Jacoby has been identified with the sales organizations of several leading car builders.

Financial Notes

Moto Meter Co., Inc., and subsidiaries report net income for the first nine months of the year of $796,824 after Federal taxes and preferred dividends of the National Gauge & Equipment Co. This is equivalent to $3.98 a share earned on 200,000 no par shares of Class A common stock and compares with income of $1,465,287 for the like period of 1926, which did not include National Gauge & Equipment. Net income available for Class A stock in the third quarter of 1927 amounted to $140,971, or 70 cents a share against $375,434 in 1926.

USL Battery Corp. and subsidiaries report net income of $875,702 for the five months ended Sept. 30, after charges but before Federal taxes. The company states that there is a large increase of sales to service stations during the period.

Paige Motor Car Co.'s offering of 300,000 common stock shares at $10 each to common and second preferred stockholders has been fully subscribed.

Overman Cushion Tire Co. reports net earnings for the first 10 months of this year as $195,122.

Oakland to Announce All-American Team

DETROIT, Nov. 21 — Announcement of Grantland Rice's all-American football team for 1927 will be made through the courtesy of Oakland Motor Car Co. over the radio on Dec. 2. The announcement will come over the hook-up used by General Motors Corp. in a special 15-minute program. The feature has been arranged by Oakland as manufacturer of the all-American car and dealers will arrange for open houses at which the announcement will be received.

Merz Company Formed to Make Aviation Engines

INDIANAPOLIS, Nov. 21 — Merz Engineering Co. has been formed here for the development and production of high efficiency aviation engines. The company has bought at receiver's sale $140,000 worth of the engine manufacturing machinery used by the former H. C. S. Motor Car Co. The site of the plant has not been determined.

Among the automotive men associated in the new company are Charles C. Merz, treasurer of the H. C. S. Cab Co.; F. E. Moskovics, president of Stutz Motor Car Co. of America, Inc.; Douglas Wheeler, president of Wheeler-Schebler Carburetor Co.; A. G. Murdock, formerly associated with H. C. S.

Dayton Airplane Upheld in War Claim Judgment

WASHINGTON, Nov. 22—Suit of the government to recover $2,500,000 from the Dayton Airplane Co., Dayton, Ohio, was dismissed this week by the United States Court of Appeals. The government had recovered a judgment for $500,000 in the lower court, but this was set aside and the suit ordered dismissed.

The claim arose out of the alleged overpayment by the government during the war in the construction of war-time contracts on a cost-plus basis for the purchase of planes. The court found that the contracts were made in a national emergency and that the parties agreed upon an estimated price, which would be the probable cost, and then the contractor should be allowed, in addition to his flat percentage, a portion of any savings which he was able to make below the estimated cost. The court held that such an agreement did not violate public policy and was valid.

John G. Hinds, Jr.

PITTSBURGH, Nov. 21—The death of John G. Hinds, Jr., vice-president of the Pittsburgh Auto Spring Co., on Nov. 12, has been announced by the company.

Steel Buying Turn Seen Near at Hand

Automotive Buyers Expected in Market for 1928 Needs —Prices Hold Firm

NEW YORK, Nov. 23—A gradual upturn in steel market activity is confidently looked for starting next week. With Thanksgiving Day week out of the way there is every reason for anticipating an orderly quickening in buying. Consumers' stocks are low. There are also indications that some automotive interests will enter the market in the course of the ensuing fortnight and prepare more actively for their first-half of January steel needs.

While the $1 per ton advance in plates, shapes and bars initiated by the leading interest, has been followed by the "independents," it remains to a considerable extent an asking price so far. It is not likely, however, that consumers will be able to shade the new 1.80 cent, Pittsburgh, price. Further price advances, however, may meet with more determined opposition on the part of buyers. As conditions improve, the continuingly ragged condition of the sheet market must be expected to give way to a firmer price situation, but forecasts of an out-and-out advance in the sheet market do not take into consideration the ever-widening competition between strip and sheet mills.

What the 1928 extent of Ford demand will be remains even more of a mystery than was the design of the new Ford car for so many weeks. Further integration of the Ford plants in their supply of primary and secondary steel products is hinted at, and this, together with the unappraisable outlet for the new car, makes it utterly impossible to resolve this unkonwn quantity in automotive steel market computations into figures fit for reasonable estimates of the outlook.

Pig Iron—Blast furnace interests say that stocks in automotive foundries' yards are very low, and as producers have curtailed output, they can afford to wait until bare yards drive melters back into the market.

Aluminum—Detroit and Middle West demand is slightly improved. In the Middle West holders of what little resale metal is in the market are asking the full prices quoted by the domestic producer. The New York market for imported metal is unchanged.

Copper—The week opened with copper quoted at 13⅝ cents, Connecticut, and 13¾ cents, Michigan, and the market fairly firm at that level.

Tin—The market has turned stronger, prospects of increased production being offset by belief that demand will be even greater.

Lead—Sentiment is improved, and the "outside" market a shade higher.

Zinc—Better consuming demand is in evidence, and prices are on the uptrend.

Quarter Tire Sales Total $223,488,000

Compare With $269,317,000 in Same Quarter Last Year —Rubber Stocks Gain

NEW YORK, Nov. 21—Total sales of tires and tire sundries during the third quarter of 1927 reached a value of $223,488,000, as compared with $269,317,000 in the corresponding period last year and $211,948,000 during the previous quarter of the current year, according to statistics compiled by the Rubber Association of America, Inc.

Crude rubber consumed during the same period amounted to 82,073 long tons, as compared with 86,290 tons a year ago and 94,983 tons for the second quarter of 1927. Stocks of crude rubber on hand at the end of the third quarter are placed at 90,861 tons, as compared with 58,883 a year and 84,811 at the end of the second quarter of 1927. Arrivals of crude rubber during the third quarter are placed at 99,731 tons.

Hardwood Prices Lower, Waiting 1928 Business

ATLANTA, Nov. 21—Hardwood manufacturers and wholesalers in the Atlanta lumber market stated this week that while sales to the automobile and body industries have been improving slowly in the past 10 days, business is not yet as large as had been expected at this time, due to the fact that comparatively few advance orders are as yet being placed. The inquiry is excellent, however, and before the holidays larger car, truck and body builders are expected to place their requirements for the first quarter of 1928 on a high basis.

Prices since Nov. 1 have been declining steadily, and the first of this week best grades of ash in thicker dimensions, principally used by the automotive industries, was $10 to $12 less than in the last of October, while No. 1 common and select, the next best grade, has declined $10 to $15. Any further declines seem certain to bring automotive manufacturers into the market on a more active basis than in several months, for prices now are about the lowest they have been in almost a year.

Develop Gasoline Process

SAN FRANCISCO, Nov. 21—Successful development of a new process for the manufacture of gasoline was announced here by J. Harry Mull, president of the Cramp Shipbuilding Co., Philadelphia. The product is being manufactured by the Petroleum Conversion Corp. at Texas City, of which Mr. Mull is a director. It is a no-knock, high-grade gasoline, made by a new method of cracking in the vapor phase, according to Mr. Mull.

Italian Factories at 30% of Capacity

WASHINGTON, Nov. 19—Production in the automobile industry of Italy, during the month of October, showed a very material decrease. Figures just furnished the automotive division of the U. S. Department of Commerce show that in Turin automobile manufacturers are working only 30 per cent capacity. Fiat, with a maximum production of 600 cars per day, is turning out approximately 50 cars. The Ansaldo Co., has just been reorganized, and increased production is being planned.

Sikorsky Plant Working on Large Plane Schedule

NEW YORK, Nov. 19—Twenty-four large amphibian airplanes, similar in construction to the Dawn, built for Mrs. Frances W. Grayson for her attempted Atlantic flight, are now under construction at the College Point, L. I., plant of the Sikorsky Mfg. Corp. Each plane will cost about $35,000.

Two of these planes will be ready for delivery by Dec. 1, two others during that month and the rest as early as possible thereafter. These planes differ from Mrs. Grayson's plane only in that they have a wing spread 10 ft. shorter. Interest in this type of plane was stimulated when her plane achieved the feat of lifting a fuel load of 50 per cent more than expected of it.

There is also under construction at the same plant a giant bomber with a wing spread of 101 ft. equipped with two Pratt & Whitney 500 hp. engines. This plane which will compete with other makes for Army purchase will cost about $100,000.

War Department Buys 166 Engines from Wright

WASHINGTON, Nov. 21—A contract for the purchase of 166 engines was placed this week with the Wright Aeronautical Corp. by the War Department. The engines are of 200 hp., air-cooled, model J-5A type, and the total cost under contract is $877,923, which includes the purchase price of the engine and certain spare parts. The engine will be used in observation planes and for training planes now on hand and in order.

Complete Fisher-Pontiac Unit

DETROIT, Nov. 19—The new Duco plant addition to the Fisher Body plant, at Pontiac, has been completed. The building, which is used for finishing bodies, will increase the output of the Pontiac plant from 800 to 1200 bodies a day.

Radiator Designs Held Patentable

Patent Office Finds Distinctive Appearance Has Commercial Value to Builder

WASHINGTON, Nov. 19—The right of an automobile manufacturer to patent his radiator design and radiator cap has again been recognized by the United States Patent Office. The fact is recognized in the appeal of Harry H. Bassett, who appealed from an examiners' decision that a radiator, because of its peculiar design, is not patentable. In reversing the decision and holding that it could be patented, the board of appeals said:

"There is a considerable commercial value to the maker of an automobile, which latter has obtained a good reputation for excellency of workmanship and durability of other features, in employing a radiator casing design which will at once appeal to the average person as indicating that particular make of automobile. In designing such a radiator casing, the limits of variation are not great because the designer must avoid anything that is very unusual or freakish in appearance.

"He must produce a casing, the general appearance of which will not depart very much from other casings and yet will be distinctive enough to cause observers to identify the make of automobile, and still further, the general appearance must be ornamental and pleasing. It would seem the radiator casings of the instant case meets these requirements.

"The degree of invention is not great but the general picture presented by the shape of figuration of the casing is not shown to be old, is ornamental and pleasing in appearances and it would appear the applicant should not be denied a patent for what he has produced."

Patents Oil Control Device

NEW LEXINGTON, OHIO, Nov. 21—William Clarke, Jr., an automobile mechanic employed in New Lexington, has been granted a patent on a device which is to be attached to the ignition switch and the oiling system of automobiles, which automatically shuts off the switch when the oil runs to a danger point. Mr. Clarke plans to manufacture the device.

Jordan Addresses Overseas Club

CHICAGO, Nov. 19—Edward S. Jordan, president of Jordan Motor Car Co., in a review of the automobile business from its start to the present time at the Overseas Automotive Club banquet during the Automotive Equipment Association show, said that in the future manufacturers will make only as many automobiles as dealers can sell at a profit.

Fokker Sees Airports Plentiful as Garages

Predicts Remarkable Development of Land Fields With Output Keeping Pace

SAN FRANCISCO, Nov. 19—Privately-owned public airports will be as plentiful in the next five years as public garages are now, in the opinion of Anthony Fokker, internationally-famous airplane builder, who was a San Francisco visitor the second week in November.

"The next few years will see a remarkable development in the air-transport business," said Mr. Fokker, "with a consequent airplane manufacturing activity that will be reflected in the establishment of a large number of factories in all parts of this country. This activity, however, can and will increase only in direct proportion to the number of municipally and privately owned commercial airports. The airplane without a place to land is not going to fly far. The cities, counties, or other unit communities, which are the most progressive in this 'ground work' for aviation will be the ones whose people will benefit the most from the new and rapidly-growing commerce of the skies, and the industry of building ships for the air.

"Many of the men who for years have been identified as leaders with the automotive industry are turning their time and their efforts to the development of the new business of air transportation. The two industries are brothers in the development of fast individual transportation; they have kindred interests, and they are confronted with the same basic problems. The growth of this infant industry of the air to date, indeed, reminds old-timers of the early days of the automobile manufacturing and operating industry. Stunt flights, endurance tests, publicity-getting efforts—all are similar to the work of the manufacturers and the drivers in the Vanderbilt Cup races, the Phoenix and Santa Monica road races, and a score of other events made historic some years ago by stock automobiles and their drivers. The same arguments now being made against the safety of the airplane were made against the safety of the automobile 20 to 25 years ago.

Exceed Automobile Factories

"In the United States today there are several hundred airplane factories—more than there are automobile factories—of which at least a dozen may be classed as 'big,' by reason of their production, their location in or near large centers of population, or the size, extent and importance of the air-transport companies to which they merchandise their ships.

"California should lead the United States in airplane development, both as to manufacturing and as to commercial operation, but the great need of this new industry today is more airports. These can be built by municipalities, or counties, or by private concerns or individuals, and operated with regular charges, such as are maintained by automobile garages similarly owned and run. In my opinion, privately-owned airports and service stations for planes will be as plentiful in this country in 5 or 10 years as garages are now.

Cites Standard Charges

"At our airport at Hasbrouck Heights, N. J., we operate a public landing field, where we have standard charges—$5 for the use of the hangar over night and the flying field during the day; $30 a month for storage in the hangar; and $1 a day just for the use of the field in landing and taking off. In the course of time there will be many privately-owned landing fields, and with the interest shown by the public in aviation, there cannot be too many of them.

"It is my belief that, within a very few years, we will have a development of air-transport activities—both manufacture and operation—that will bring us up to the European standard. Then, all air-mail pilots will be carrying passengers as well as mail; new transportation companies with ample financial backing will be earning good profits in the business, and the 'gypsy' flyer will be eliminated in the interest of public safety and the welfare of air transportation. The time is not far distant when good two-seated planes will be offered for sale at $1,200."

No D.C. Bus Line Ever Gone Broke

WASHINGTON, Nov. 21—Is the operation of motor buses a profitable business? Irrespective of the answer in other localities, in the District of Columbia, figures just compiled by the Public Utilities Commission, show that since the initiation of the first bus in 1912 no local bus company has ever gone broke or suspended operations. They have changed hands but have continued to operate and in most cases, have put more buses into service.

Figures of the Commission show that today there are 537 motor buses engaged in interstate operation here, carrying a total of 6808 passengers daily.

Cooper Hewitt Moves

NEW YORK, Nov. 21—The general offices of the Cooper-Hewitt Electric Co. have been moved to the company's new building at 410 Eighth St., Hoboken, N. J.

Coast Motor Lines Increase Operations

Carry 3,000,000 More Passengers in Present Year—Smaller Lines Absorbed

SAN FRANCISCO, Nov. 21—Material growth in the operating of motor stages in California is shown by the annual report of the auto stage and truck department of the California State Railroad Commission, just completed and released. The report covers the fiscal year ending June 30, 1927, and shows that on that date there were 620 motor stage and truck lines operating in California under the jurisdiction of the commission. Eighty-six of these were engaged in the transportation of passengers only, 224 handling passengers and property, and 310, or one-half of the total number, carrying property only. Of this last-named 310, there are 120 which are designated as "special carriers," since they are limited to the transportation of special and specified commodities.

This is a reduction of 35 from the 655 stage and truck lines operating on July 1, 1926, but the lowering of the number is due to the revocation by the railroad commission of a large number of certificates of operation covering passenger and property transportation services which have been abandoned by persons holding mail-carrying contracts, which expired on June 30, last year.

The report further shows that the stage lines carried 33,000,000 passengers, in the 12 months from July 1, 1926, to June 30, 1927, an increase of 3,000,000 over the greatest previous annual total. Net investment of all motor carriers within the state is placed at $27,037,011, with total revenues of the lines reporting placed at $22,451,646, and total expenses of $21,341,415, leaving a net revenue of $1,110,230.

Some consolidation has been made, largely through the absorption by larger stage and truck lines of the smaller companies, during the year covered by the report. These purchases and consolidations indicate the development of large-size stage line operations in place of the many small, individual lines, and the evidence is that the amalgamations have increased the service and convenience offered the public, as well as bettered equipment. Schedules have been materially improved, and increased understanding of the needs of the traveling public is manifest.

Persia to Omit Tariff

WASHINGTON, Nov. 21—The U. S. Bureau of Foreign and Domestic Commerce is advised by its represenatives in Persia that effective at an early date the tariff duties on motor vehicles, valued at less than $3,000, including trucks of all kinds, tires and tubes, will be removed.

Tire Dealers Urge Factory Cooperation

LOUISVILLE, Nov. 21—More than 1000 tire dealers from all parts of the country attended the four-day convention of the National Tire Dealers Association, which was held here Nov. 14 to 17. Percentage of dealer gross profit on solid tires came in for considerable discussion, it being brought out that the cost of doing business in the retail tire field ranges from 18 per cent to 23 per cent and that unless a dealer has a gross margin of at least 25 per cent he cannot exist.

The solid tire dealers went on record as favoring cooperation with the Better Business Bureau, to eliminate unfair practices, recommended exchange of credit information and discussed proper methods of handling accounts. Tire manufacturers will be urged to continue cooperating with the association and members in establishing national accounts, and will be requested to consult with the organization before opening new accounts, and to check up present national buyers to ascertain whether or not they are all entitled to national discount.

British Tire Exports Gain

WASHINGTON, Nov. 19—A total of 718,454 casings were exported from the United Kingdom to foreign countries during the first nine months of this year, an increase over the total for the same period of last year which totaled 626,392, the Department of Commerce announces. The figures show that during this nine months period 336 casings were shipped to the United States and 158 to Canada.

Glidden Gets Contract

CLEVELAND, Nov. 19—The Glidden Co., of Cleveland, will furnish lacquer for finishing the new Ford bodies, Adrian Joyce, president, announces. Local plant authorities would not comment on reports that they had the exclusive contracts to the job.

Coming Feature Issues of Chilton Class Journal Publications

Feb. 18—Statistical Issue—Automotive Industries

Jan. 1—National Shows Number—Automobile Trade Journal.

Jan. 5—National Shows Issue—Motor Age.

Insurance Fund Plan Suggested in New York

NEW YORK, Nov. 19—The United Auto League, Inc., through its president, Philip J. O'Brien, has sent a letter to Governor Smith protesting his proposed two-cent gasoline tax and offering to submit a plan which, in its estimation, should realize $40,000,000 a year for the state.

The letter calls attention to the opposition of the taxicab men to the governor's proposed plan and suggests a plan for state insurance whereby every motor vehicle in the state would be insured for $50 a year. Mr. O'Brien indicated his belief that this plan would raise the necessary revenues and at the same time give the general public protection in all automobile accidents.

Cincinnati Show in Music Hall

CINCINNATI, Nov. 21—Twenty-one dealers will display cars at the Cincinnati Automobile Show, which will mark the opening of the reconstructed Music Hall, Jan. 15 to 21. The reconstruction of Music Hall at a cost of more than $100,000 has given Cincinnati a building which is admirably adapted to an automobile show, the north and south halls of the first floor affording 34,944 ft. of space. Trucks will be shown on the second floor over the south hall, which offers 17,704 sq. ft. of floor space.

Speakers are Named for Highway Meeting

WASHINGTON, Nov. 21—The seventh annual meeting of the Highway Research Board will be held here on Dec. 1 and 2, at the National Academy of Sciences. The meeting is open to all persons interested or engaged in any branch of highway engineering.

C. F. Kettering, president, General Motors Research Corp., will be the principal speaker at the annual dinner to be held the first night of the session. Other speakers include Charles M. Upham, director of the board; T. R. Agg, Vernon Kellogg, A. B. Fletcher, S. J. Williams, W. C. Markham, Thomas H. MacDonald, A. T. Goldbeck, H. S. Mattimore, H. R. Trumbower, and H. J. Kirk.

Ames New England Speaker

BOSTON, Nov. 19—Warren Ames, of the B. C. Ames Co., Waltham, Mass., was the speaker at the November meeting of the New England Section of the S.A.E. this week, his address being on Precision Measurements in Manufacturing and Service. He was introduced by Chairman Frank E. H. Johnson. It was a very interesting talk and many service station employees and managers were present in addition to the regular S.A.E. members. After the talk Mr. Ames answered a lot of questions. The lecture was made more interesting through showing actual parts, these being loaned by the Noyes-Buick Co.

122 Fly in Five Days

DETROIT, Nov. 19—During the first five days of operation of the passenger air line between Detroit and Cleveland, from Tuesday to Saturday inclusive of last week, 122 passengers were carried. The fare one way is $18 with a round trip cost of $35. Schedules are arranged so that practically a full day can be given to business without the inconvenience of an overnight train trip.

Calendar of Coming Events

SHOWS

All Western Road Show, Los Angeles, March 7-11
American Road Builders Association, Public Auditorium, Cleveland.Jan. 9-13
*Boston, Mechanics Bldg.....March 10-17
*Chicago, National Automobile Chamber of Commerce, Coliseum, Jan. 28-Feb. 4
International Aircraft Show, Berlin, March 23-April 11
Lille, France, Exposition....Nov. 20-Dec. 4
*New York, National Automobile Chamber of Commerce, Grand Central Palace .....Jan. 7-14
Rio de Janeiro .....May 3-13
Salon, Automobile Salon, Inc., Hotel Drake, Chicago .....Jan. 28-Feb. 4
Salon, Automobile Salon, Inc., Hotel Biltmore, Los Angeles .....Feb. 11-18
Salon, Automobile Salon, Inc., Hotel Commodore, New York..Nov. 27-Dec. 3
Salon, Automobile Salon, Inc., Palace Hotel, San Francisco..Feb. 25-March 3
United States Good Roads Show, Des Moines .....May 28-June 1

*Will have special shop equipment exhibit.

CONVENTIONS

American Automobile Association, Annual Meeting, Hotel Statler, Boston .....Dec. 2
American Road Builders' Assn., Hotel Hollenden, Cleveland .....Jan. 9-13
American Road Builders' Association, Banquet, Hollenden Hotel, Cleveland .....Jan. 11
American Society of Mechanical Engineers, Annual Meeting, New York City .....Dec. 5-8
Automotive Equipment Association, Grand Hotel, Mackinac Island, June 10-16
National Foreign Trade Council, Houston, Texas .....April 25-27
National Research Council, Washington, D. C. .....Dec. 1-2
Overseas Automotive Club., Inc., Monthly Luncheon, Hotel Astor, New York .....Dec. 8
United States Good Roads Association and Bankhead National Highway Association, Des Moines.May 28-June 1

N. A. D. A.

Chicago, Jan. 31-Feb. 2—Annual, Palmer House.
Chicago, Feb. 1—Banquet, Palmer House.
New York, Jan. 9-10—Eastern District, Hotel Commodore.

S. A. E.

National

Chicago, Dec. 1—Tractor Meeting.
Detroit, Jan. 24-27—Annual Meeting.
European trip—Nov. 2-Dec. 12.
New York, Jan. 12—Annual Dinner.